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Board of Natural Resources
Colstrip Hearings

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THURSDAY, MARCH 25, 1976

The hearing reconvened at 8:30 A.M. on Thursday, March 25, 1976, in the Chambers of the Montana House of Representatives, State Capitol, Helena, Montana.

The Honorable Carl M. Davis, Hearings Examiner, presided over the proceedings.

APPEARANCES:

Applicants:

John L. Peterson, Esq.
John Ross, Esq.

Department of Natural Resources and Conservation:

Arden E. Shenker, Esq.
Donald MacIntyre, Esq.

The following proceedings were had:

MR. PETERSON: We will call as our next witness for rebuttal, Donald B. Gregg, and we move into evidence Exhibits number 233, 236, 237, 238, 239, 240, 240-A, 240-B, 240-C, 240-D, 240-E, 240-F, 240-G, 240-H.

DONALD B. GREGG, called as a rebuttal witness by the Applicants, having been first duly sworn upon his oath, both as to his written direct testimony and as to the oral testimony to follow, was examined and testified as follows:

(THE WRITTEN DIRECT TESTIMONY OF MR. DONALD B. GREGG WAS DIRECTED TO BE INSERTED AT THIS POINT.)

STATEMENT OF TESTIMONY

OF

DONALD B. GREGG

My name is Donald B. Gregg and I reside in Butte, Montana. I am employed by The Montana Power Company as their Manager of Power Contracts, Resources and Planning. I have held that position for about 14 months, and prior to assuming that position I was the Company's Manager of Power Operations for about ten years. That position entailed the major responsibility for operating the bulk power system of The Montana Power Company in the interconnected western network. Prior to my position as Power Operations Manager, I spent three years in our Rate Department; some six years as Transmission Design Engineer, and three or four years in various other engineering jobs. My total employment time with the Company has been about 26-1/2 years. I am a graduate of the University of Colorado in Boulder, Colorado, with a Bachelor of Science Degree in Electrical Engineering. I am a member of Tau Beta Pi, Honorary Engineering Scholastic Society. I am also a senior member of the Institute of Electrical and Electronic Engineers and am a registered professional engineer in the State of Montana.

MONTANA AS AN EXPORTER OF ELECTRICAL ENERGY

There have been many remarks made in these hearings about the State of Montana (as distinguished from Montana Power Company) being an exporter of electrical energy with the implication that all we need to do to supply our future needs in Montana is to cease exporting. Most of these statements have been made without a clear understanding or explanation of the realities of the situation. The common figures available for this kind of conclusion are those of the Federal Power Commission and the Edison Electric Institute regarding electric sales and electric production within the State of Montana. A direct comparison of these sales and production numbers would be improper or misleading for three principal reasons:

1. The sales figures are taken at the consumers' meters and therefore do not include any transmission and distribution losses. Total sales, then, do not represent a measure of total consumption (sales + losses) in the State.

2. For the purpose of determining how much electric energy is available within the State to meet the needs of Montana residents, the generation (production) figures are not adjusted for production which is dedicated to loads outside the State of Montana. Here I refer specifically to the entire production of the Noxon Rapids Plant which is owned by Washington Water Power Company, which has only a few customers in the State of Montana. The Noxon Plant is about 11 miles from the Montana/Idaho border. I also refer to the some 70% to 80% of the production of the Fort Peck, Canyon Ferry and Yellowtail Plants, whose output is marketed by the U.S. Bureau of Reclamation to preference customers in North Dakota, South Dakota, Minnesota and Nebraska.

3. A third error in the use of state-wide sales and

production numbers to indicate surpluses for planning purposes is that the recent historical numbers, with the exception of the year 1973, occurred during years of at least average or better than average hydroelectric water conditions in the State. Thus the recent production figures are clearly inflated over those that would be necessary for proper planning to serve firm loads, because firm loads must be served in "dry" years as well as "wet" years.

As an example of these problems with comparisons of sales and production numbers for the State of Montana, let me cite the 1973 figures from the Edison Electric Institute Statistical Yearbook publications. In that year there were 9136 millions of kilowatts hours produced by the generating plants within the State of Montana. Similarly the reported numbers for sales to ultimate consumers within the State of Montana were 8572 millions of kilowatt hours. A simple erroneous comparison of these two figures would indicate that Montana was an exporter of electrical energy by some 564 millions of kilowatt hours.

This is not so, however, because the sales figures to the ultimate customers were measured at the customers' meters and thus do not include any allowance for the transmission and distribution losses that occur between the generators and the customers' meters. In recent years, such losses on The Montana Power Company system have run in the range of 10% to 12% of total sales. Therefore, to find the generation required to supply the total sales to ultimate consumers, we must add to the sales of 8572 million kilowatt hours approximately 10% losses. The total consumption in the State (i.e., sales plus losses) would, therefore, be about 9429 millions of kilowatt hours. When this consumption number is compared to the total production number, it indicates that Montana must have imported about 293 million kilowatt hours.

Furthermore, if we use these numbers and comparisons to determine the amount of electrical energy available within Montana for Montana residents' use, we must remember that the Noxon Rapids generation in 1973 amounted to 1227 million kilowatt hours and the portion of generation at Fort Peck, Canyon Ferry and Yellowtail Plants which was exported outside the state to other markets amounted to 1881 million kilowatt hours. When we adjust the 9136 million kilowatt hours of production by subtracting the amounts dedicated to outside markets, we find a new production number available for Montana residents of 6023 million kilowatt hours. This production, when compared to the total consumption of 9249, shows that Montana indeed imported in the year 1973 about 3221 million kilowatt hours for Montana residents, or about 35% of consumption.

Similar preliminary numbers for the year 1974 would show that Montana imported some 3423 million kilowatt hours for the use of its residents, or about 33% of consumption. The 1973 numbers for hydroelectric production reflect a somewhat drier year than normal, but not as dry as the historically most adverse water year. The 1974 numbers reflect a water year which was considerably wetter than normal.

I have not included here a discussion of other complicating factors in the marketing of Federal power in Montana from Libby and Hungry Horse plants which would further increase the indicated import to Montana.

RECENT ACTUAL LOADS IN THE NORTHWEST AREA

There is much testimony from various DNR witnesses in these hearings concerning the recent load experience in the west group area of the Northwest Power Pool. Lieutenant Governor Christiansen, Dr. Brewer, Mr. Wicks and others all referred to numbers reported by Bonneville Power Administration in their Monthly Power Situation Statement. Indeed, Dr. Brewer on page ten of his prepared testimony, indicates that in the months of September through November of 1975 as compared to 1974, the load in the Coordinated System of the Northwest area grew only 3.03% and implies that this shows a significant leveling off of load growth. What Dr. Brewer failed to mention was the fact that the non-firm interruptible industrial load of Bonneville Power Administration (essentially the aluminum industry in the Northwest) has been running in that time period about 36% below what it was running in the September-November period of 1974. This is due solely to the depressed aluminum metals market in 1975.

If only the firm load in the Coordinated System of the Northwest were examined in the time frame used by Dr. Brewer, we would find that the firm load (without the non-firm industrial load included) grew at a rate of 5.6% in the September-November period of 1975 over 1974. In fact, if we add one more month to his comparison numbers so that we are looking at the period

September through December of 1975 versus a similar period in 1974, the firm load in 1975 was 7.1% over a comparable period in 1974. Finally, to bring the numbers up to date, if we look at the period September 1975 through January of 1976 and compare it with a similar period one year earlier, we find that firm load growth in the Northwest Coordinated System was 7.0% over that one year period. These growth numbers for firm loads in the range of 6% to 7% are somewhat above the growth rates forecasted by the Applicant Companies in these hearings and reflect sustained firm load growth despite the economic recession. The figures are developed on Applicants' Exhibit No. 236.

The foregoing discussion indicates clearly that the firm load in the Pacific Northwest is growing recently at a higher rate than the Applicant Companies have forecasted, even though the major industrial components of total load are still rather severely depressed due to the economic recession. Total load is, in fact, running below the estimate, but primarily because the industrial interruptible load is running well below its capability. None of the Bonneville Power Administration industrial load is served by any of the Applicant Companies. Furthermore, the Applicant Companies do not plan to build additional resources to serve interruptible loads.

A further note of clarification concerning the BPA Power Situation Statement (PSS) is in order. Several opposition witnesses have talked about sales to the Pacific Southwest Region (primarily California) from the Northwest reported in the PSS as though they represented something sinister, or that they could be applied to meet Northwest loads, or that they were included in the Northwest total load figures, or they were not so included, etc.

The record should show clearly that the Coordinated System loads and forecasts discussed and tabulated on the Bonneville Power Administration Power Situation Statement do not include sales to regions outside the Northwest. Sales to the Southwest Region are reported in the text of the PSS for information purposes and generally are stated as to both firm and secondary (surplus) sales. Furthermore, any implication that these sales could somehow help serve Northwest area loads is erroneous. The firm portion of such sales is a firm contract obligation (generally associated with Canadian Treaty Power) and is not available to the Northwest until withdrawn from California in 1978 and 1982 as shown on some of the Applicant Company resource exhibits. The secondary (or surplus) portion of such sales, was obviously not needed at the time in the Northwest and therefore was declared "surplus" and sold outside the region -- generally to reduce oil consumption in California.

Such secondary or surplus power is available from time to time because stream flows are higher than the historically adverse flows, or because loads are less than forecast. Typical causes of loads being less than forecast are weather departures from normal and abnormal economic conditions.

RECENT ACTUAL LOADS OF THE APPLICANTS

Similar to the analyses of the Northwest area's Coordinated System load that I have just discussed, we can analyze the individual Applicant Companies' loads in the period September 1975 through December 1975, as compared to the similar period in 1974. To avoid reading all the pertinent figures into the record

I have prepared Applicants' Exhibit No. 237, which indicates the actual experience in the two periods for each of the five Applicant Companies and a composite total of the five. Reviewing these numbers shows that Puget Sound Power and Light Company's average energy load in those four months increased 10.0% over a similar period in 1974. Portland General Electric Company's load increased 5.9% for that period. Pacific Power and Light Company's average energy load increased 9.9%. Washington Water Power Company's load increased 8.4%. And The Montana Power Company's load increased 2.5%. The composite of all five companies' average loads in the four months from September 1975 through December 1975 has increased 8.0% over a similar period in 1974.

On the peak side, the numbers for December 1975 indicate Puget's peak load increased 16.4% over 1974, Portland General Electric's peak load increased 8.8% over December 1974, Pacific Power and Light Company's peak load increased 15.1%, Washington Water Power Company's peak load increased 11.5%, and Montana Power Company's December peak load increased 10.8% over 1974. The composite of all five companies' peak numbers increased 13.0% over 1974.

At this point, special mention should be made of Montana Power Company's unique situation in which some 15 to 20% of their total load is represented by the Anaconda Company's mining and smelting load. This load, like the aluminum industry load in the Northwest, has been severely depressed in 1975, generally because of the economic recession. If the Montana Power Company numbers are adjusted by removing the Anaconda Company load and the minor interruptible loads, so as to approximate the firm "base" load, the comparison of average energy in the period September through December 1975 over 1974 results in an 8.7% growth rather than 2.5% growth on total load. The December peak load similarly rises to 16.8% growth in one year compared to 10.8% on total load. These figures are shown in the "memo" column on the right side of Applicants' Exhibit No. 237.

All of the above discussion serves to counter the claims of the opponents that load growth rates have dropped sharply in the last year or two and reinforces the Applicants' contention that loads will continue to grow at a rate in the range of 5 to 6% because the root causes of that load growth are still operating. The Applicant Companies do not contend nor agree that one year's load growth numbers are sufficient evidence for long-range forecasting as the opponents, in their continual citing of near-term changes in total load growth, would have us believe. However, when the actual near-term numbers are properly adjusted to eliminate the effects of the economic recession on just one portion of the Northwest economy (i.e., the aluminum and copper markets) it can be seen that the load growth of the remainder of the electrical load is sustained, despite the economic recession. In fact, it appears from these near-term numbers that the cross-elasticity with competing forms of energy is operating stronger than the price-elasticity of electricity itself. Thus if the recession impacts are normalized, the results on load growth a combination of of/other important factors such as price and cross-elasticity, supply of competing forms of energy, increasing saturation, and population growth could operate to even increase the past load growth rates. I don't contend here that one or two year's history is sufficient evidence to support that conclusion, but the above-cited numbers do show clearly that the base load growth rate has not dropped sharply in the immediate past as the opponents would have us believe.

NORMALIZED NORTHWEST LOADS VS. FORECAST

Dr. Brewer, Mr. Wicks and Mr. Christiansen, in their direct testimony, all referred to the "fact" that the West Group Area actual loads recently are below forecast. Dr. Brewer, at page ten of his testimony, cites that the January numbers were about 2,000 megawatts below forecast. Again, the use of raw numbers without proper qualification can be misleading.

Citing Bonneville Power Administration's Monthly Power Situation Statement for January 1976, we find that the Coordinated System energy load for the month of January was 15,786 average megawatts. The corresponding forecast for that month for the Coordinated System was 17,217 average megawatts, a difference of only 1431 megawatts. That forecast included 1063 megawatts for the interruptible aluminum industry load and was based on normal temperatures in January. When we account for the fact that the aluminum industry interruptible load was only 497 average megawatts, the adjusted difference between actual and forecasted loads is some 865 megawatts.

We must further consider the fact that January 1976 was about 4.8° F. warmer than normal in the Northwest, on a weighted average basis, and that the experienced change in load with each degree of temperature change is about 125 to 150 megawatts per degree in the Northwest. Thus, the actual load would have been about 600-700 megawatts higher than it actually was, had the temperature been normal.

The Northwest forecasts assume normal temperatures and also account for the potential industrial load, assuming a normal economic situation. Thus, to test the efficacy of a forecast by comparing with actual loads, adjustments have to be made for differences in temperature from normal and differences from forecast in such abnormal major loads as the interruptible aluminum industry load. When these adjustments are made for the month of January, 1976, it becomes clear that the actual load was within 165-265 megawatts (or 1-1.5%) of the adjusted forecast.

The differences due to economic recession in the aluminum industry cannot be discounted unless we are willing to accept a continual depression. The utilities (BPA in this case), in forecasting such loads, must assume a return to normalcy in their planning forecasts in the absence of clear information to the contrary. To do otherwise and thus not build sufficient facilities to serve a normal industrial load would insure a continued economic recession for lack of energy to sustain recovery.

MORE RECENT MONTANA POWER COMPANY NORMALIZED LOADS

Since Mr. Hofacker's testimony on January 19, 1976, The Montana Power Company has experienced another new winter season peak load. The February 4, 1976 peak load on The Montana Power Company system was reported at 973 megawatts, of which 895 megawatts was our resource responsibility. This winter peak load of 895 megawatts compares with a forecasted peak of 945 megawatts. The forecast included 152 megawatts for the Anaconda Company in accordance with their latest information given to us. The 152 megawatts includes about 35 megawatts for their new electric furnace at Anaconda. On the day of the 895 megawatt peak, the furnace was loaded to about 4 or 5 megawatts. Thus, the actual load could easily have been 30 megawatts higher than it was. In addition, on that same day, the average daily mean temperature at Montana Power's major load centers was some 5° above zero. Had that average temperature been 15 to 20° below zero as is normal for our peak producing weather, the peak load would have been about an additional 40 megawatts higher. Therefore, our peak load for the winter of 1975-76 conservatively could have been 965 megawatts compared to a forecast of 945 megawatts.

Similarly, our energy load in January, 1976 ran 676 megawatts compared to a forecast of 714 megawatts. After normalizing for the lack of Anaconda Company's electric furnace load and the fact that the average temperature in January was about 5.8° above normal, the normalized actual load would have been approximately 722 megawatts of average energy, or about 8 megawatts above forecast.

Preliminary figures for February, 1976 show that the total energy load was 656 megawatts compared to a forecast of 672 megawatts. Again, normalizing for Anaconda Company's electric furnace and 4.1° warmer than normal temperatures, results in a normalized actual load of about 691 megawatts, about 2.8% above the forecast.

The normalized January and February, 1976 firm "base" energy loads of The Montana Power Company were 8.9% and 7.7%, respectively, above corresponding loads in 1975. Incidentally, the Anaconda Company recently informed us that the electric furnace should be fully operational by April 1, some six to eight months later than originally forecast.

RECENT IMPACTS ON MONTANA POWER FORECASTS

Two more significant items should be mentioned about Montana Power Company's forecasts. We have recently been advised by the Magnetohydrodynamics Research Group in Butte (MHD) that they will require some 40 to 45 megawatts demand on our system for their project, commencing about 1980. This specific load is not included in our forecasts in these hearings, but obviously must be served to carry on this important research. We do not know yet how much of this load will impact in our peak load, but expect 8-10 megawatts of average energy load.

Also, Mr. James Follensbee, the manager of the Central Montana Electric Generation and Transmission Cooperative has testified in these hearings that the U.S. Bureau of Reclamation has notified the Central Montana G&T member systems that it cannot provide for their additional requirements beyond the year 1977. Since Montana Power Company only serves about 35% of the Central Montana G&T member systems' requirements, only about 35% of their load growth beyond 1977 is reflected in The Montana Power Company forecast. Mr. Follensbee indicated their total requirement increase on The Montana Power Company system will be about 150 megawatts between now and 1985. Of that 150 megawatt increase only about 50 megawatts is already accounted for in The Montana Power Company's estimates. Thus, unless Central Montana G&T finds some other supply source, an additional 100 megawatts will be required from Montana Power which is not now reflected in our forecasts.

FORECASTS IN GENERAL

All of the testimony in these hearings relating to load forecasts has been conjecture about what the future will bring. The Applicant Companies have all presented their individual load forecasts based on their intimate knowledge of the use of electricity on their own systems, and the patterns and economic relationships within their own service territories. Various opponent witnesses have presented testimony based on econometric models or sectoral forecasts of loads in the nation or in the Pacific Northwest region. All of these analyses, when projected into the future, result in conjecture because all of the forecasts depend upon estimates of the future population, economic indicators, demographic factors, availability of alternate fuels, etc. Price and cross-elasticities are factored into some of the more sophisticated forecasts and, are invariably based on nationwide numbers recently developed without sufficient tests to prove their accuracy or applicability to the area served by the Applicants. The Applicant Companies are better qualified to make these various estimates because of their intimate knowledge of their own service areas.

It is true that forecasts of the future can never be totally accurate, as Dr. Brewer suggests. We suggest, however, that our forecast is more accurate than Dr. Brewer's because it is limited specifically to our own service area. It must be clear, moreover, that if we err on the low side, then the economic stagnation and export of our young people from the Pacific Northwest will be a certainty because of lack of energy to sustain the jobs which our young adults so badly need, and which a growing and thriving economy demands. To deny this energy by denying permission to build required energy conversion plants is to deny economic stability to the region.

POPULATION AND LOAD GROWTH

One of the major driving forces behind increased load growth is the population increase in the Northwest. Despite the fact often cited by the opponents that population growth rates are decreasing since the post-war "baby boom", logic would demand that 20 to 25 years after that boom, those babies are now young adults seeking a place for themselves in this world and trying to establish families and homes here in the Northwest. The population distribution in the next 10-20 years is as important as the growth rate in determining the impact on electrical loads. Applicants' Exhibit No. 238 shows that distribution in the Pacific Northwest in 1975 as prepared by Bonneville Power Administration. The bottom four rows of the pyramid indicate those who are now in the 0-19 year age group and who will move into the prime working years between now and 1995. At the middle of the pyramid are those currently in the 45-64 year age group and who will be retiring by 1995. The difference between those entering the working years and those leaving is about 1,000,000 people --- persons who are already here. We must be prepared to provide for the electrical energy demands of these young adults or, alternately, be prepared to export them out of the area to some other sections of the country.

LOAD GROWTH RATE SENSITIVITY

Applicants' Exhibit No. 239 shows the Applicants' composite surplus or deficiency in average energy under three different load-growth scenarios for the years 1975-76 through 1985-86. It depicts the situation which would prevail if opponents' witness Dr. K.R. Shah's forecast of the Applicants' composite energy load in 1975-76 were to grow uniformly at 6% per year (near the growth rates forecasted by both Dr. Shah and the Applicants) and alternately if the uniform growth rate were only 4% or as high as 8% per year. It assumes that all other plants in which the Applicants have an interest remain on their current schedule, but excludes Colstrip Units 3 and 4.

Referring to Applicants' Exhibit No. 239, at 4% growth rate, using Dr. Shah's beginning year load and the Applicants' resources from Applicants' Exhibit No. 3C, it is clear that the Applicants would require 150 megawatts of additional energy in 1981-82 and 529 megawatts additional in 1982-83 to meet their customers' requirements. At 6% growth rate, roughly in accordance with Dr. Shah's and the Applicants' forecasts, the Applicants would need 685 megawatts of additional energy in 1980-81 and increasing amounts thereafter, amounting to the full energy availability (at 75% availability factor) of Colstrip Units 3 and 4 by 1981-82. At an annual load-growth rate of 8%, which is not impossible assuming a strong economic recovery, the Applicants would need 1334 MW additional energy (well more than the energy capability of Colstrip 3 and 4) by 1979-80 to reliably serve their customers' needs. Both the 6% and 8% cases also show the serious consequences possible because of the delays from original schedules for the Colstrip Project. In 1978-79 and 1979-80, when Colstrip Units 3 and 4 were once scheduled for completion, deficiencies ranging from 294 to 1334 average megawatts are indicated.

These three scenarios with different load growth rates indicate how extreme is the sensitivity to future load growth of the Applicant Companies' ability to serve their customers' demands. Much of the debate on growth rates hinges on arguments over one or two percentage points and all forecasts are speculative. It is the Applicant Company's responsibility to supply the demands as they arrive, and it is incumbent upon them to be prudent in their forecasting so as not to commit too much capital to too much plant too soon. If we fail in providing sufficient energy to support the economy, we help to insure a continuation of the economic dislocation that this country and our region have suffered since late 1973.

GROSS NATIONAL PRODUCT (GNP) VS. ENERGY GROWTH

There is much convincing evidence that total energy consumption and electric energy use are both strongly correlated to the standard of living as measured by the GNP. Dr. Chauncey Starr, President of the Electric Power Research Institute, in a presentation to the Joint Committee on Atomic Energy on July 10, 1975, illustrated this correlation in the United States as shown on Applicants' Exhibits Nos. 240 and 240A, which I have reproduced from Dr. Starr's presentation. Applicants' Exhibit No. 240 shows a plot of the United States GNP in constant 1958 dollars versus total energy consumption (of all forms). Exhibit No. 240A shows similar information regarding electrical energy consumption. The trend lines on both exhibits illustrate rather convincing "technical" and statistical correlation.

Dr. Starr also presented a chart relating changes in electrical energy consumption with changes in employment in the United States which I have reproduced here as Applicants' Exhibit No. 240B. Again, the convincing correlation of electrical energy use with a major measure of our economic life is apparent.

Similarly, the Bureau of Mines of the U.S. Department of Interior, in December 1975, published a chart illustrating the remarkably close correlation between changes in total energy consumption and changes in GNP in the United States. I have reproduced that chart here as Applicants' Exhibit No. 240C and add a simple quotation from the text of the Bureau of Mines report describing the chart:

> "The close correlation between economic activity (as measured by gross national product) and energy consumption is illustrated in figure 8. Here the annual rates of changes of both are plotted. Noteworthy is the close correlation between the two."

This chart and quotation are taken from "United States Energy Through the Year 2000 (revised)", by Walter G. Dupree, Jr., and John S. Corsentino, Bureau of Mines, U.S. Department of Interior, December 1975.

In answer to those critics of our "wasteful" and "luxurious" use of energy in the United States, let me quote another portion of the Bureau of Mines publication just cited:

> "One further indicator of the trend in energy consumption is the energy consumed per dollar of GNP where GNP is measured in constant 1958 dollars. The energy/GNP ratio has a long-term downward trend. In 1947 the ratio was 106,400 Btu per dollar of GNP and it declined to a low of 85,700 in 1966. Some anxiety was expressed because the long-term downward trend reversed in 1966 and steadily rose until it peaked at 92,900 Btu per dollar of GNP in 1970. This ratio is a rough measure of the 'dollar' efficiency of energy utilization in the economy and any reversal would indicate a reversal in our long term increases in efficiency. However, the upward trend changed slightly in 1971, declining to 92,000 Btu per dollar of GNP. This was followed in 1972 by a further decline in the ratio to 91,000 Btu per dollar of GNP, and an even further decline in 1973 to 89,000 Btu per dollar of real GNP. The ratio stabilized in 1974 at 89,000 Btu, due primarily to the recession. Continued stabilization of the ratio is expected for 1975. A return to the long-term downward trend is considered to have a high degree of probability."

Applicants' Exhibit No. 240D is a reproduction of another chart from the cited Bureau of Mines publication. It shows that our total energy consumption in the United States has "turned the corner", as Dr. Brewer coined the phrase and as Mr. Christiansen and others have alluded to, several other times than 1974, 1975 and the depression years of the 1930's. Specifically, I refer to 1949, 1952, 1954, and a two-year leveling off in 1957 and 1958. Almost all past experiences of "turning the corner" have been associated with economic depressions, recessions, or other undesirable anomalies.

Further evidence of the correlation between GNP and energy use, and of our efficiency in the use of energy in enhancing our standard of living comes from Mr. Fremont Felix, Planning and Development Consultant, Gibbs and Hill, Inc., who has published several articles in various issues of Electrical World magazine comparing such matters for hundreds of countries around the world.

In the December 1, 1974 issue of Electrical World, Mr. Felix published a chart relating total energy use per U.S. dollar of GNP to U.S. dollar per capita GNP for about 80 countries of the world. The data, for the year 1972, was taken from Series J, No. 17, Statistical Papers of the United Nations World Energy Supplies, compiled by A.J. Ramsdell. On November 1, 1975, Electrical World published essentially the same chart in easier-to-read form by Mr. Felix, which I have reproduced as Applicants' Exhibit No. 240E. Note that the United States, with its high living standard as measured by GNP per capita of about $5570, used about 2.2 kilograms of equivalent coal total energy per U.S. dollar of GNP in 1972. Note also that West Germany, Sweden and Switzerland (nations held up to us by the opponents as frugal energy users and blocked out by me on the chart) all use less energy per U.S. dollar of GNP but they also enjoy appreciably less per capita GNP than does the United States.

Several opponent witnesses have suggested that the United States could easily get along on less energy per capita or per dollar of GNP as West Germany, Sweden or Switzerland do. Exhibit No. 240E strongly suggests that we could do so only at the cost of reducing our GNP per capita (and therefore, our living standard) to the level of these other countries -- a drop of 20% to 40% in our GNP per capita. And this could be done only if we reduced the pay scale of American workers to that in West Germany, Sweden or Switzerland, or if we created substantial unemployment by producing less.

It is interesting to note in passing that the economics of most of the Eastern European nations which have no substantial consumer sector and which are centrally planned show up on this chart in the poorest light. They have substantially higher energy use per dollar of GNP and appreciably lower GNP per capita than most of the industrialized free nations.

To display similar information concerning electric energy consumption per dollar of GNP (contrasted with total energy consumption) I have re-plotted data from Mr. Felix's work as published in Electrical World on Applicants Exhibit No. 240F. As with total energy, the United States is shown to lie on the bottom boundary. This means that the electric energy consumption to produce a unit of GNP per capita is lower in the United States than any other nation with anywhere near the same per capita income.

APPLICANTS' RESOURCES BY DR. SHAH

Dr. K.R. Shah's testimony in this case essentially corroborated the Applicants' load forecasts. Dr. Shah, however, made some astounding assumptions regarding the Applicant Companies' resources. First, he failed to use net rating (rather than gross rating) on some units of the Applicants. Thus, for example, he rated the Colstrip 1 and 2 units at about 40 total megawatts more than their net capability. Most surprising among his assumptions, however, was that the Companies could and would run all their oil-fired gas turbine units and their old, oil-fired obsolete steam units as base-load plants for energy. This is clearly contrary to the national administration's energy policy and the goals of Project Independence which are designed to reduce our dependence on petroleum-based fuels.

During Dr. Shah's presentation of his testimony in these hearings, Applicants' Exhibit No. 233 was prepared based upon the number of average megawatts of energy from oil-fired units which he included in his estimates of the Applicants' resources. Dr. Shah's estimates result in the assumption that the Applicant Companies will be able to get an additional 12.1 million barrels of oil for their gas turbines, internal combustion units, and oil-fired steam generating units in 1980, for example. He also failed- probably because he didn't know - to reckon with the fact that Portland General Electric Company is under orders by Oregon State environmental and regulatory authorities to cease using about 25-30% of their gas turbine capacity.

At the time I prepared Applicants' Exhibit No. 233, I estimated the cost of oil at $12 per barrel based on recent quotations for oil at Billings with pipeline delivery from the refinery next door. I have since been informed by the coastal utilities that they are currently paying about 33¢ to 37¢ per gallon for oil on the coast, or $13.86 to $15.54 per barrel. It appears proper then, at this time to indicate a change in the Applicants' Exhibit No. 233 to re-price the oil on the lower section of the Exhibit at an average of about $14.70. This would increase the total difference number of $145,698,000 annually to about $178,000,000 annually. These numbers, incidentally, do not include any allowance for escalation in fuel costs. To the fuel costs must be added the variable operation and maintenance costs (those that are a function of kilowatt-hour output) amounting to about $20 million annually.

It should be further noted that, using Dr. Shah's assumption, we would have to build additional peaking units to replace some of the capacity of Colstrip 3 and 4. That additional peak capability, using Dr. Shah's logic, would be in the form of additional gas turbine units.

At an escalated cost by 1980 of about $160 per kilowatt, the approximate 900 megawatts of capacity which would have to be replaced would cost the Applicants an additional $144 million investment. This results in an annual cost of about $29 million for carrying charges on that investment. In addition, the fixed operating and maintenance costs (excluding fuel and other variable O&M costs) for operating those new gas turbines would add some $2 million annually to the cost of the Applicants and their customers. Thus, Dr. Shah's scheme of meeting the energy needs of the Applicants and restoring some of their peak capability would cost some $229 million annually ($178+20+29+2) and would require burning an additional 12.1 million barrels of oil which may not be available. This compares with an estimated $202 million per year to own and operate the Colstrip Project to produce the same energy with coal. Thus, Dr. Shah's assumptions, while costing the Applicants' customers $27 million annually, also do great damage to the Nation's energy policy. The above discussion ignores the value to the Applicants and their customers of 500 MW of peak capability and about 350 MW of energy capability if Colstrip were build as planned, rather than the gas turbines.

Dr. Shah protests that other gas turbines are used as base-load units elsewhere in the country, but I suggest that such is not a matter of choice in many places, but a necessity because of delays in licensing and constructing new, well-designed coal-fired and nuclear base-load units. Even Dr. Shah, in his testimony, noted that he does not consider gas turbines as base-load units. Additionally, the concept of using the gas turbines and oil-fired units in the Northwest for base-load would require the addition of massive increases in oil storage facilities on the sites at substantial additional cost.

ONE NOTE ON CONSERVATION

Much has been said in these hearings and elsewhere about the role of conservation, and numbers in the range of 5-10% have been mentioned as possibilities. It should be made clear that a sustained 5% conservation effort will not reduce load growth from, say, 6% per year to 1% per year. Assuming the 5% represents "wasteful uses" of electricity and can be eliminated, the other 95% of present load and any future load must be considered to be "legitimate". Therefore, new load growth would be reduced from, say, 6% per year to 5.7% per year.

It should also be remembered that the experience in the Northwest's 1973 shortage resulted in a probable 5% sustained conservation effort. Anything greater than that effort will probably require involuntary conservation.

U. S. ELECTRICAL ENERGY FORECASTS

Dr. Starr in his presentation to Congress' Joint Committee on Atomic Energy in July 1975, also presented a chart comparing the U. S. electric energy demands in 1985 and 2000 as projected by some ten different organizations and agencies, most of whom are highly knowledgable in energy matters. Some of these forecasts have been mentioned by various witnesses in these hearings and I have reproduced Dr. Starr's chart as Applicants' Exhibit No. 240G with some minor additions. I have shown thereon, as a dashed line, a 6% annual growth line as roughly indicative of the composite growth rate to 1986 forecasted by both the Applicant Companies and by DNR witness, Dr. Shah. The extension of the 6%

dashed line to the year 2000 is done for illustration and does not purport to represent the Companies' (nor Dr. Shah's) forecasts beyond 1986. I have also shown the forecasts made by the Bureau of Mines in their publication earlier cited in this testimony.

Of specific interest here is that most of these forecasts were made in 1974, after the oil embargo, and include some recognition of conservation efforts and various strategies to "solve the oil problem". There is rather wide disparity among the various forecasts, certainly by the year 2000. In the 1985 era, with the exception of the Energy Policy Project forecast of the Ford Foundation, the range among forecasts equals about 25% (one trillion Kwh out of four trillion Kwh). The 6% growth line is at the lower level of the bulk of these forecasts, which indicates clearly that many experts feel the growth rate in the next decade will be substantially above 6%.

Most authorities do not agree with the Energy Policy Project forecast nor with Dr. Brewer's 2 to 3% generalization.

SOME NOTES ON ELECTRIC SPACE HEATING

Extreme caution should be exercised in reviewing the "efficiencies" of using electricity vs. burning fuels for space heating. A common error (or tactic, in the case of those trying to obfuscate real issues) is to forget the heat which "goes up the stack" in the case of burning fuels.

Dr. Brewer makes the common error on page twelve of his testimony and Dr. Morris makes a similar error on page fourteen of his testimony. Dr. Brewer states there is an "extreme economic penalty" in electric heat and proceeds to "prove" his point by citing a few numbers. What he proves is his inability or unwillingness to make a valid comparison. He uses electric rates about double the current rates in the Northwest for residential home heating, and compares with oil rates only 20-30% above the current rates. Then he forgets that conversion efficiency in burning oil to get usable heat into a home is typically about 40-45%. This results from a furnace efficiency of about 65% (35% of the BTU's go up the stack) times a "delivery factor" of about 65% (35% of the remaining heat is lost in heating up the combustion air for the furnace, in furnace and fan cycling, duct losses, etc.). In case of individual room-controlled baseboard electric heating systems, the conversion efficiency is typically 95% since almost all the heat generated is available and useful in heating the room.

A correct comparison with current rates (1.55/kwh and 38¢/gal.) and using proper conversion efficiencies (95% and 43%) would result in about $4.77 per million BTU for electric heat and $6.31 per million BTU for oil furnace heat. Using Dr. Brewer's assumed future electricity cost of 3¢/kwh (a 94% increase) and, say, only a 50% increase in future oil costs (to 57¢/gal.) results in $9.24 per million BTU for electricity and $9.47 for oil.

These numbers are indicative of the forces behind substantial conversions and new installations of electric space heating and process heat that the utilities are experiencing today.

Dr. Morris refers to "low efficiency" coal-fired electric power plants when comparing with other coal technologies. Yet, similarly, he conveniently forgets to mention the efficiency of the final process required to get the "coal-gas" or "coal-oil" converted to usable heat or mechanical energy.

1976 WEST GROUP FORECAST

The new West Group Forecast of the Pacific Northwest Utilities Conference Committee is now published. Since there seems to be much interest in this report, I have marked it Applicants' Exhibit No. 240H. -

As described in the transmittal letter, dated February 18, 1976 and appearing as the first document of the Summary and Discussion section, this forecast indicates a ten-year annual average growth rate for the West Group area of 5.1% peak and 4.8% energy. By 1985-86, the new forecasted loads are less than last year's forecast by 954 megawatts peak and 466 megawatts energy.

The most significant change in this year's forecast is the addition of a measure of the probability of meeting the forecasted energy load in any given year and the cumulative probability of meeting energy loads through all years to the indicated year. These probabilities are derived from a new probabilistic simulation program called the Energy Reserve Planning Model which treats rigorously the four general components of the Northwest energy load-resource picture -- hydro energy capability, thermal plant construction timing, thermal plant availability, and load. It uses the Monte Carlo Simulation technique which derives statistical results from a mass of repeated trials (500 in this case). The Model is discussed in some detail on pages 10-13 of the Discussion Section in the West Group Forecast.

Results of the Energy Reserve Planning Model study are given on the summary tabulation of Estimated Loads and Resources appearing immediately after the colored bar charts in the Summary and Discussion section of the West Group Forecast at lines 13 through 16. They show, for example, that in 1980-81 there is an

88.4% probability that all firm energy loads in the West Group Forecast area will be served (line 15). Alternately, there is only a 67.2% chance that all firm energy load will be served from now through 1980-81 (line 16).

There has been no criteria established for a satisfactory energy probability, but when compared to the established criteria on peak in the Northwest of 95% (19 years out of 20 we will not have to curtail peak load, according to forced outage reserve criteria), the energy criteria should be much more strict -- maybe 99.95% or higher. This is simply because the consequences of failure are so much more burdensome and costly. If peak load is not met for a few hours of two or three days in 5% of the years, the consequences are not nearly as catastrophic as would be the case of having an energy deficiency of the same magnitude (say, 1000 megawatts) lasting for several months or even years. The unemployment, economic dislocation and general misery caused by such an energy deficiency are far worse than the inconvenience of "spot" peak shortages. Thus, the probability criteria should be much higher for energy than for peak.

The above discussion is analagous to the poker player who might be willing to draw to the infamous "inside straight" when the stakes are $2.00 or $3.00. But if the stakes are his home, his job, his family, and his very livelihood, a sane man would fold the hand rather than draw to the inside straight.

HEARINGS EXAMINER: Mr. Shenker will cross-examine.

EXAMINATION OF DONALD B. GREGG

Rebuttal, Cross, by Department of Natural Resources and Conservation

By Mr. Shenker:

Q Mr. Gregg, you've attended this hearing from time to time on a number of occasions to be of whatever assistance you can to counsel and your company. This, of course, is the first time you've testified. I hope to be able to confine your testimony as much as possible to the relatively limited number of areas that I want to ask you about, sir. The first of those is with respect to your comment on page 1 of your statement, line 25, where you refer to remarks that have been made in these hearings about the state of Montana being an exporter of electrical energy. Are you referring to remarks made by Mr. Goldhammer and Lieutenant Governor Christiansen?

A As I recall, Lieutenant Governor Christiansen made several comments about this in this field. There have been -- I believe Mr. Wickes also discussed this problem, or this area, where they insist that Montana is an exporter.

Q Did you hear Mr. Goldhammer say that when he testified?

A No, I didn't hear Mr. Goldhammer's testimony and I have not read it.

Q Now, on page 2 of your statement, Mr. Gregg, at lines 11 through 14, you tell us the total sales don't represent a measure of total consumption because consumption is comprised of both sales and losses; is that right?

A That's correct.

Q Now what do you mean by losses?

A Well, as I stated in the prior paragraph, the common figures that are used for any comparisons of production and sales to arrive at whether or not an area is an importer or an exporter, generally, and in almost all cases that I've heard involving this argument, involve sales figures which are figures derived from the utility's sales to their consumers, which are derived in turn from the meter readings at the consumer's premises. Those sales, then, obviously -- those measured sales at the meters obviously do not include losses from that meter back to the generating station on the entire distribution and transmission system the utility required to get that energy to the consumer.

Q The greater the losses, you would agree with me, Mr. Gregg, would you not, the more inefficient the system in delivering the energy to the consumers?

A Obviously.

Q Sure. And if you wanted to see what the consumers were actually doing by way of greater or lesser use of the energy, then you would want to know only what their actual consumption was?

A That's correct. Right.

Q Now you've read the statements of testimony of Dr. Kent Anderson, called as a witness here on behalf of the applicants, haven't you?

A That is correct.

Q In particular in connection with the rebuttal testimony of Dr. Anderson, which I understand will be offered in evidence and I don't believe that anyone intends to ask any further questions on that testimony, there is marked as an Exhibit number 254 to Dr. Anderson's testimony. Do you happen to have that with you?

A I don't have it here at the table, no.

Q Well, it's a document titled "Total Sales to Ultimate Customers by Company, 1960 to 1975" that Dr. Anderson put together for each of the five applicants and for the total of the five applicants?

A I generally recall that exhibit, yes.

Q Now that would be sales data and would not include losses in the way that you've described it, right?

A That's right.

Q All right. And if we wanted to know what the growth in the consumption by the consumers was for any of the years involved in the data set forth in Dr. Anderson's testimony, we could do that by just comparing one year to the next, couldn't we, if we wanted to know annual growth?

A Yes.

Q Oh, good, Mr. Peterson is handing you a copy of that.

(Mr. Shenker posts to drawing board.)

Q On the board, Mr. Gregg, I have put down the computations of the percentages that show the growth, or the lack of growth for that matter, taken from Exhibit number 254 in columns that I'll identify. The document is marked for identification as DNR Exhibit number 46. You see the column headings MPC for Montana Power Company, PP&L for Pacific Power and Light Company, PGE for Portland General Electric Company, PSPL for Puget

Sound Power and Light Company and WWP for Washington Water Power Company. The next column is all five, meaning all five of the applicants together, and the final column is average of five. Now, since some of the companies are larger than others, obviously the larger companies will weight the average and for that matter they will also weight the computation for all five of the companies; wouldn't that be correct?

A If the average of the five column is merely the average of the -- if the in-column on the right hand end is merely the average of the numbers in the first five columns, I would have to agree with you.

Q Sure. And when you look at all five of the companies together, if one of the companies, for example Puget Sound Power and Light Company obviously is a larger company in terms of the total megawatts that they sell, then the other five -- it will weight the total for all five because of the size of that one; isn't that true?

A If they were the largest, yes they would weight it.

Q Sure.

A Certainly. I can't disagree with what you're trying to say.

Q Well, you don't doubt that they're the largest, do you?

A Yes, I do. I think Pacific Power and Light is probably the largest of the five companies.

Q That's what I thought I said?

A No, you were talking about Puget as I recall.

Q I'm sorry I misquoted myself. Thank you for correcting me. Pacific Power and Light Company is the largest of the five, isn't it?

A Currently, yes. According to Dr. Anderson's numbers, it's the largest in terms of sales to ultimate consumers.

Q Right. Now, in the columns on the left hand side of DNR Exhibit number 46, we have the years that are compared taken from Dr. Anderson's data. The first year is 1972 to 1973 and we have the percentage of growth or decrease; there is growth on behalf of each of the companies except Montana Power Company which had a decrease of 1.6 percent. You wouldn't disagree with those percentages based upon the figures that Dr. Anderson has on Exhibit 254, would you?

A Well, not having had an opportunity to calculate those percentages, I don't know whether I could agree or disagree, but presuming the calculation is correct, and they look reasonable from a quick glance at all these numbers on his exhibit, I presume they're correct.

Q It's not hard to tell, for example, that Montana Power Company sold less in '73 than it did in '72 and there's been some kind of decrease, right?

A That's obvious, right.

Q Sure. But if you compare 1973 to 1974, all five of the companies had an increase which ranged from a high of 2.5 percent in the case of Washington Water Power Company to a low of six tenths of one percent for the Portland General Electric Company. Now that's what it shows on DNR Exhibit number 46?

A That's what the figures show, yes.

Q Okay. And again, of course, you have not done the actual calculation, but it appears to be reasonable, doesn't it?

A I believe so, yes.

Q The next column is a comparison of the latest two years that we have, 1974 to 1975. All five of the companies show an increase ranging from a high of 7 percent for the Puget Sound Power and Light Company to a low of one tenth of one percent for the Montana Power Company, right?

A That's what the numbers on your exhibit show, yes.

Q And just so we understand what the last four columns do on the left hand side of DNR Exhibit number 46, we're trying to get a look at an annual growth or decrease factor. So if you look at the years 1973 to 1975 together that's two years of growth; we divide by two and that gives us the average over those two years on an annual basis. If we do that then we find a range of a low of eight one hundredths of one percent decrease for the Montana Power Company to a high of 4.1 percent increase for Puget Sound Power and Light Company. And continuing on, the fifth column down has 1972 to 1974 similarly compared over a period of two years; you divide by the number two to get the annual growth or decrease, and you have a high of 3 percent for Pacific Power and Light Company, a low of five one hundredths of one percent decrease for the Montana Power Company. And the final column is a comparison of the three years, 1972 to 1975; of course you have to divide by three then to get your annual growth or decrease. You have the Montana Power Company at six one hundredths of a percent decrease as the low and Puget Sound Power and Light Company with 4.1 percent increase as the high. The final column shows that it is the average of numbers 4, 5 and 6, which would be the average for a three year period looking at each of the three years individually compared at the top of DNR Exhibit 46, and when you take your average of each of the three years, then you come up with Montana Power Company having a zero at the low side and Puget Sound Power and Light Company at 4.2 percent on the high side. That is what the figures show on DNR Exhibit number 46, and that's a reasonable presumption of the correctness of the calculations as I've described them; is it not, sir?

A I believe so. I'm not sure I agree with that method of arriving at an average, but if that's the way you've done it and the calculations are correct, I can't disagree with the numbers.

Q Okay. Now if you will turn with me, Mr. Gregg, to page 9 of your statement, line 9, I take it to be your testimony there, sir, that you do not believe that load growth rates have dropped in the last year or two; is that right?

A I don't believe that the load growth rates as reflected in the last couple of years, two or three years, last year or two I guess is what I said in the testimony, is a valid indication of what the future will bring in that the immediate past future, the last five or six months by my testimony,has clearly shown that the firm load on our systems is growing at a considerably higher rate than the total load would show in the last year or two.

Q I'll get in a moment to the question of what portion of the load you look at, but I'm trying to see if I can't get you to look at the language of your statement itself to see if you may have misstated yourself and just wanted to clear that up. It's on line 9, of page 9, and I think it says that the load growth rates have dropped sharply in the last year or two, you believe to be the opinion of the claims of the opponents. Now, do you disagree with the statement that those load growth rates have dropped at all in the last year or two?

A Mr. Shenker, I have to agree that the total load growth has dropped in the last year or two. The context in which this statement in my testimony is cast is that that is not an indication of what the fugure will bring and that the loads will continue to grow at a rate in the range of 5 or 6 percent because the root causes of that load growth haven't been removed.

Q Now, I understand your testimony, Mr. Gregg. You say that you believe just as the applicants' projections indicate from the exhibits that they've put in. Mr. Hofacker has testified about this and other folks on behalf of the other applicants. You think you're going to grow 5 to 6 percent on an annual basis as you project for the next ten years; I understand that. But I just want to make sure now from your testimony this morning; you do agree that the total load growth rates of the applicants have dropped in the last year or two?

A From their prior growth rates?

Q Yes, sir, you do agree with that?

A Yes.

Q All right. And, of course, you would really have to agree with that on a wider scale, wouldn't you, when you were to compare, for example, the West Group Forecast for 1975, which is Exhibit 118 of the applicants in this proceeding, with the new West Group Forecast, Applicants' Exhibit number 240-H as that shows a diminution in load growth by a factor of some 3.1 percent, if you'll look at the first year in which they do their calculations, doesn't it?

A I'm not sure I understand the meaning of your term 3.1 percent. I'm not sure what diminution you're talking about.

Q Well, if you'll look at the number of average megawatts predicted in the West Group Forecast in 1975 for the first year -- now look back by the West Group Forecast for 1976. It would be the year 1976, wouldn't it?

A Yes.

Q Okay. For that year the average growth is down 3. -- excuse me, not average growth -- the average energy projected is down 3.1 percent over what it had been the previous year -- or under what it had been the previous year?

A Well, I'm sure Mr. Goldhammer testified that it is lower than what was in last year's forecast. I haven't done the calculation to arrive at a 3.1 percent. It's down about 450 some odd megawatts out of 14,000 or 15,000.

Q So that's how you would determine the percentage. You would divide the 14,000 into the 400 odd, and you get 3.1 percent?

A Right.

Q Okay. So we know that if you look at the entire West Group they are down, in fact, from the two immediate last forecasts we have for the entire West Group. That's a fact; there's no doubt about that, is there?

A Yes.

Q Okay. Now, if you'll turn with me to page 11 of your statement, there you discuss the rather substantial effect that the aluminum industry has on the total Bonneville load, and, of course, therefore, on the entire West Group load. Now, you don't disagree with Dr. Anderson's statement, do you, Mr. Gregg, that the projections he has made as the consultant hired for West Group are based upon a 25 percent reduction of energy consumption by the aluminum industry as a result of the use of a new process in that industry? You don't disagree with that, do you?

A Frankly, I haven't read Dr. Anderson's testimony that carefully.

Q Volume 18, page 3053?

A Pardon? What was that reference?

Q Jack just wrote it down. It's volume 18, page 3053. If Dr. Anderson says there, and I think you'll find he does, that his projections are based upon a 25 percent reduction in the energy consumption by the aluminum industry because of a different process which it will have available to it, would you disagree that that is a valid way in which to do the projections?

A If he has real knowledge that that will happen, I presume it's a valid way to do the projection. However, I frankly doubt that the aluminum industry in the short-term can convert to a new process that is 25 percent more -- pardon me, that's a misuse of the word 25 percent -- that the aluminum industry can accomplish that kind of reduction by converting to a new process in the next four or five or six years. I think probably over the long run that may well by the case.

Q Well, if we're looking at growth in the aluminum industry, we are looking at the installation of new production facilities in the aluminum industry, aren't we?

A If we're looking at growth in the aluminum industry, that's correct.

Q Sure. And, therefore, on the installation of new facilities, each company would have the option as to what process it installs, one of its considerations being the amount of energy it would consume in the process; wouldn't that be true?

A That may well be, however, the initial growth that we're facing in the aluminum industry right now is just getting back to presently installed capacity.

Q Now, that gets me to the question that you alluded to somewhat earlier; I told you we'd come back to it; that's the question of what portion of a load you look at to determine growth. The five applicants are not uniform in the way they look at their load broken down into categories; isn't that true?

A I doubt if any two utility companies will look at their load categories and classifications in exactly the same way.

Q Okay. And you, for example, have what you call a base load here in the Montana Power Company largely excluding the Anaconda Company, which has a very substantial effect upon your total load?

A That's correct.

Q Some companies look at what they call a firm load, and some companies define firm load differently from other companies?

A That's true.

Q And whether you look at the base load, the firm load, categories such as residential, commercial or industrial loads, will tell you only that part of the load picture, right?

A That's true.

Q And if you want to take a look at the entire load picture, then you're going to have to eventually grapple with all the categories and all the breakdowns within the total load of any system?

A Obviously.

Q Good. Now, page 12. There you tell us something of recent experience of the Montana Power Company with your peak loads, and you tell us at line 7 that your actual load could have been 30 megawatts higher than it was. Now, Mr. Gregg, why did you tell us that?

A Because Anaconda Company has a new electric furnace on test right now that originally was forecast to be on line full time sometime this last fall. They're running about five to six months behind schedule, and on the day of that peak that I was discussing at line 7 of page 12, the furnace was loaded to 4 or 5 megawatts, not the 35 megawatts that it will have on it in the next probably two weeks.

Q So what you're telling us, I take it, is that if you had had a different load to service on this particular day when you had a very high load for your system, then you could have had an even higher load; is that it?

A That's correct. Had the furnace been on line, that load would have been probably some 30 megawatts higher than it actually was.

Q Well, doesn't that sort of sound to you like saying if I were Rockefeller I'd be richer than Rockefeller because I'd do a little investing on the side?

A No, it's just trying to be realistic. That is a load that's connected to our system, that is intended to be run practically full time, it's currently on test, it wasn't on line the day that we hit that system peak, and let's face it, we have to be realistic in trying to meet our loads, and we have that exposure.

Q Well, in being realistic, how much have you reduced the Anaconda Company load in your projections over the last year?

A As I recall the numbers, and I think Mr. Hofacker testified to this in his testimony in January, there were some in the range of 45 to 55 megawatts reduction in Anaconda Company's load over the prior years forecast.

Q Now, if you'll turn with me to page 15 of your statement, sir, there I take the burden of your argument to be that if you in the Montana Power Company -- look at line 2 -- err on the low side of projections, then that may require the export of young people from Montana, and if all of the applicants and all of the utilities in the Pacific Northwest err on the low side of their collective load forecasts, then that might require the export of young people from all of the Pacific Northwest. That's really what you're saying there, isn't it?

A That's essentially what I've tried to say, yes.

Q Let me see if I understand then -- assume, if you will, that the other four applicants err on the high side and they indeed have surpluses as a result of that error, but the Montana Power Company has erred on the low side, then, of course, you would be talking about exporting young people from Montana to other parts of the Pacific Northwest, wouldn't you?

A Or possibly importing power from the Northwest if that surplus actually exists, and buying it for Montana.

Q Now, similarly, if the applicants or any of them should err on the low side, excluding the Montana Power Company which in this assumption I ask you to make errs on the high side, then you would find the potential for exporting young people from the Pacific Northwest into Montana or exporting power from Montana into other parts of the Pacific Northwest, right?

A That's possible.

Q So what you're really telling us then, I suppose, Mr. Gregg, is that if we are to look at energy planning from a regional perspective, then we're all going to have to be dependent upon each other; isn't that true?

A And that was really the context in which this statement was made in my testimony on the top of page 15. I was talking about the Pacific Northwest region, yes.

Q Sure. And we are all dependent upon each other, so that if there are surpluses in one place there will be the opportunity to meet deficiencies elsewhere and vice versa, right?

A Certainly, to a limited extent.

Q Well, what's the limitation on that extent?

A Transmission capability to move power.

Q Sure. Now, page 16, line 24. You tell us that if you were to apply an annual load growth rate of 8 percent, the applicants would need 1334 megawatts of additional energy by the year 1979-1980. I have two questions with respect to that statement, The first is, does anyone on behalf of the applicants seriously argue that their collective load growth will be at an 8 percent figure?

A Well, I hesitate to speak for the rest of the applicants at this juncture, however, I think I can't disagree that such is a possibility in the light of the recent experience that we've seen as a result of coming out of the current recession.

Q But your opinion is that the growth will be between 5 and 6 percent?

A That's what our long-term forecast indicates, yes.

Q My second question to you with respect to the same statement, Mr. Gregg, is that we all know that the Colstrip units will not generate an additional 1334 megawatts by 1979; isn't that true?

A That's true.

Q What are you going to do about that if, indeed, the possibility becomes a probability and you have 1334 megawatts of additional energy necessary by 1979?

A Well, for one thing, we're going to pray a lot.

Q Good. We'll all join you in that. What do we do next?

A We have some odds that -- and I'm not prepared to try and define what the odds are--of having better than critical water.

Q You mean you'll have more hydroelectric energy?

A We will have more hydroelectric energy available to meet that indicated deficiency. We have limited capability to purchase power from other regions, but some energy might be purchased from the Californians if they can get oil to fire their oil-fired units, and if all that fails, we will have to curtail load.

Q Or effect conservation on a more rigorous basis than has been the case thus far?

A Yes.

Q Which is, of course, one of the things being considered right now by the panel of governors from the western states under the study being conducted by Mike Katz?

A I'm not sure who's conducting the study, but I presume you're talking about the Pacific Northwest Regional Commission; is that the correct terminology?

Q It was the commission that Mr. Goldhammer described; Mike Katz, of course, is the chief economist for Bonneville Power on loan for the purposes of the study?

A I'm vaguely familiar with that. That is a program designed to determine how to manage the shortage, if it comes, and prepare the mandatory curtailment procedures or conservation procedures or what have you, that will be necessary to properly manage a shortage of severe magnitude in the Northwest.

Q Okay. Turn to page 17, please. John, will you hand Don also a copy of Exhibit 265 which is attached to Dr. Anderson's statement. In comparing gross national product and energy growth, as you have on page 17 of your statement, Mr. Gregg, do I take it to be your argument that there is no nation in the world which is consuming less electricity per percentage of gross national product than the United States?

A Could you repeat that question? I'm not sure that I caught one word there that I'm --

Q Sure. Let me back up for just a little bit, then. Your position, as I understand it from your statement, is that the United States consumes less energy or less electricity per gross national product than any other nation in the world?

A No, that isn't what I said.

Q Oh, good, because Dr. Anderson, of course, sets forth in Exhibit 265, the ratio of electricity consumption to the gross national product for a number of nations, and the United States is at 1.68 on its ratio, whereas there are on Exhibit 265 listed ten other nations of the world who have a lower ratio in consumption of electricity per gross national product; isn't that true?

A I can't disagree with that, but I thought my statement was rather clear that in looking at the exhibits -- we are talking about my discussion on the bottom of page 17 and top of page 18, aren't we?

Q That starts your discussion on the comparison of gross national product and energy growth, yes. Were you finished with your answer?

A Yes. I'm trying to think how to finish the answer that I started. The discussion on the bottom of page 17 and the top of page 18 in my statement relates to the correlation between gross national product and either total energy consumption or electric energy consumption in the United States.

Q Yes.

A Later in the discussion on gross national product versus energy growth, I discussed Applicants' Exhibit 240-E.

Q Yes, and F.

A Yes, E and F, which is obvious that the United States does not have the lowest consumption of energy per unit of gross national product. There was no intent to make that kind of erroneous point at pages 17 and 18.

Q Good. I'm glad that you cleared that up, that you were not intending to make that point. If we look at the total energy to gross national product ratio, that's set forth in the next to the last column in Dr. Anderson's Exhibit number 265, and there we would find 16 nations of the world there listed who have a lower ratio of total energy consumption to gross national product, wouldn't we?

A Yes, that's true.

Q Okay. If you'll turn with me to page 19 of your statement, sir, at line 18 you state that in the years 1949, 1952, 1954, 1957 and 1958, there have been leveling off periods with, I suppose, reference to both gross national product and energy consumption, or at least electricity consumption; is that correct?

A Well, in referring to Applicants' Exhibit number 240-D, that leveling off that I was discussing related to energy, not necessarily to gross national product.

Q All right. Your statement immediately thereafter is the part that interests me, where you say that those past experiences, I take you refer now to those years, 1949, '52, '54, '57 and '58 --

A Right.

Q -- have been associated with economic depressions, recessions, or other undesirable anomalies. Was there a depression in 1949, 1952, 1954, 1957 or 1958?

A There was certainly a recession in '49; there was a recession in '58 --

Q I was asking you about that separately. Was there a depression in any of those years?

A There was in the 1930's, of course, which is also encompassed in this general statement that almost all past experiences have been associated with such things. I don't know, frankly; maybe you can help me. I don't know the difference between a depression and a recession.

Q All right. What were the undesirable anomalies that occurred in 1949, '52, '54, '57 and '58?

A Pardon, would you repeat that question? I missed it.

Q You referred to undesirable anomalies. What were they that had occurred in 1949, 1952, 1954, 1957 or 1958?

A Well, as I recall the situation in '49 I had one heck of a time finding a job in 1949.

Q That was an undesirable anomaly, wasn't it?

A That was an undesirable anomaly, yes. Unemployment rates were up, I believe, in that year. I frankly haven't checked the particular numbers in 1949. I recall vividly the recession of 1958. I think everyone of even my age recalls the depression of the '30's in the mid-30's, and the following one in the late '30's, 1938. The point I'm making here is that the consumption of energy in this country follows closely almost all the normal generalized indicators of economic activity, so that if we have an economic recession or a depression resulting in high unemployment rates and all the human misery that's associated with that sort of thing, that the energy consumption does level off, and, in fact, if the energy capability or the capability to produce energy, usable energy, in this country should level off, that the converse is true; the result will be high unemployment and other undesirable economic situations.

Q That's an undesirable anomaly?

A Right.

Q Now, Mr. Gregg, the word you used was that the consumption of energy "follows," that's phrased in the present tense, the economic conditions of the country. I suppose what more accurately you mean to say is that from the historic past it has followed; isn't that correct, sir?

A Well, I don't think there are any experts that can tell us really which comes first, the chicken or the egg.

Q Good. That is rather a problem, to determine the cause and effect, isn't it?

A That's right.

Q But I was just worrying about the accuracy of our record. What you meant to tell us, I think, was that as you looked at the figures over the historic past, you had seen a correlation; that's what you meant to tell us, isn't that right?

A That's true.

Q Okay.

A And I can draw the very simple conclusion that -- logical conclusion -- that since the gross national product, for instance, is closely correlated to energy consumption --

Q Has been, you mean?

A Has been -- should a shortage of energy capability arise, that the economic situation will also slow down, unemployment rates will rise.

Q Did you finish your answer?

A Yes.

Q Good. Now, page 21, please. By the way, Mr. Gregg, you're not an economist by training, are you sir?

A No, sir.

Q What was your degree in school?

A Electrical engineering.

Q Okay. On page 21 of your statement, you refer to the applicants' resources by Dr. Shah, and what you say at line 19 is that he made some astounding assumptions. Before I ask you about the boundaries of your astonishment, I am rather astounded by your statement that you believe Dr. Shah corroborated the applicants' load forecasts. In the first place, Dr. Shah was under instructions as to how he should conduct his forecasts. Do you know what those instructions were?

A Well, I heard you discuss that with Dr. Shah when he was under cross-examination, or on your redirect with Dr. Shah and I'm not sure I understood what those instructions were. No, I really, frankly, cannot say I understand what the instructions were.

Q All right, sir. Let me refresh your recollection from the testimony that you heard. His instructions were to take the applicants' figures at their face value and apply them on a uniform basis with the expertise available to Dr. Shah, but not to conduct an independent analysis of demand. Do you understand that now?

A No, frankly, I don't because if he was instructed to take them at their face value, he could easily have just restated them.

Q I see. Well, of course, if he found something wrong with the way they were stated, in terms of the expertise of load forecasters, you would expect him to say what he thought was wrong with the way that the forecasts were stated, wouldn't you?

A I presume so; if he didn't agree with them, then he was instructed to change them, I presume. Then it becomes his forecast, I presume.

Q Let me give you an example, Mr. Gregg. You here in the Montana Power Company are familiar with the rather substantial effect the Anaconda Company has on your load, right?

A That's correct.

Q Now Dr. Shah did not come into Montana and interview the folks at the Anaconda Company separately in order to make his own determination of what the Anaconda Company component of the Montana Power Company load would be. You understood that, didn't you?

A I presumed that, yes.

Q Sure. Now, if you had supplied to Dr. Shah figures in which you had calculated that the Anaconda Company portion of your load would grow at 10 percent per year, and simultaneously provided with Dr. Shah the actual loads which the Anaconda Company and you had contracted, would be served over some period of time, and obviously by mathematical analysis that's substantially less than 10 percent a year, that would be something he would have to correct if he were doing his job right; wouldn't you agree?

A Yes.

Q Okay.

A And I presume he'd have to do that in all other classifications of the forecast.

Q Yes, sir. Residential, commercial, industrial, right?

A Which as I understand then becomes his forecast, not our forecast.

Q All right. Now, if you'll look at Exhibit 212-A for the DNR, that's the one from which you drew your figures to prepare Exhibit 239; that's Dr. Shah's analysis of loads, resources, surpluses, and deficits. Do you have that handy?

A No, I don't have Dr. Shah's handy.

MR. SHENKER: Do you have that, John? It's 212-A for the applicants. It's attached to Dr. Shah's statement.

Q Dr. Shah, in his load forecast portion of his overall analysis, has two columns, A and B, doesn't he?

A Correct.

Q Column A is labeled "Applicant Companies' Forecast" and column B is labeled the "Commonwealth Forecast," right?

A That is correct.

Q Now, are those the same for energy in 1975-'76?

A No.

Q Dr. Shah forecasts lower than the applicant companies, right?

A Slightly, yes, on energy. I don't answer peak here --

Q No, I'm ignoring peak for our discussion because as I understand it you don't have a peak problem in the Pacific Northwest. Now, 1976-1977, are the Commonwealth and applicants' forecasts the same?

A No, sir.

Q Commonwealth is lower, isn't it?

A That's correct.

Q The next year, 1977-1978, Commonwealth is lower again, isn't it?

A That's correct.

Q And the next year, '78-'79, we again have Commonwealth lower?

A Correct.

Q And the year 1979-1980, is the same thing true?

A That's correct.

Q And the year 1980 and '81, the same thing is true again?

A That's correct.

Q And the year '81 and '82, the same thing is again true?

A That's correct.

Q And for each following year, 1982 - 1983, 1983-1984, 1984-1985, where he stops, Commonwealth's forecast is lower than the applicant companies' forecast as the figures were reported to him and he evaluated them in this exhibit, or these exhibits, right?

A Correct, slightly lower, and as I recall Applicants' Exhibit number 234, the compounded load growth over that nine or ten year period by Dr. Shah in his forecast was some 5.96 percent growth rate compared to his analysis of the companies' forecast at 6.17 percent or something very close to that.

Q Yes. What that exhibit really tells us is that accepting the companies' load forecasts at their face value and doing two different things to them, first putting them on a uniform basis, which is the applicant companies' forecast, second applying the expertise of a load forecaster, but staying with the applicants' own figures, you ought to get the load growths that the applicants themselves were projecting, shouldn't you?

A He essentially did.

Q I don't see how one could do otherwise when you're using the applicants' figures, do you?

A If that were his instructions, to come up with the same load forecast we had, fine. I can't imagine him doing that kind of work, frankly.

Q I see. Now, as to the astonishment that you had with the assumptions made by Dr. Shah, would you tell me what those were, please?

A That astonishment related not to the load forecast, but to his analysis of our resources.

Q Tell me what your astonishment was.

A Well, for one thing, in at least one case and probably others, although I wasn't able to analyze his work totally, he used gross generation figures, gross generation capability at some of the applicants' plants, to indicate the net available for load.

Q Like, for example, he might have used 357 megawatts from Colstrip 1 at which you've been operating?

A We've operated at 357 gross, but we've only gotten about 330 net available for load because the other 27 megawatts has gone for auxiliary use in the plant. That's one area where he made some basic errors in his resource analysis.

Q Of course, he described the basis on which he determined what net capacity he would use for the facilities in his statement, didn't he? Do you recall that, Mr. Gregg?

A I presume he made some description of what the basis of those numbers were, but if he said he used gross capability on those units and was going to serve consumers' load with that gross capability, he made a total error in judgment or logic.

Q Is it your testimony that that's what he said?

A No, I can't remember what his testimony was specifically on what the specifications were on each of these plants. You were leading me into this; I frankly don't recall what his specifications were for each of those plants.

Q Yes. Now, actually, you would agree with me, would you not, Mr. Gregg, that what Dr. Shah said on page 36 of his statement was that he was dealing with the operating availability?

A Okay. I recall his general concern with operating availability, yes.

Q All right. Now, I take it that the other aspect of your astonishment is what you set forth beginning at line 23 and 24 of page 21, and that's the fact that among the assumptions that Dr. Shah made was that companies could and would run oil-fired gas turbine units. Now, do you have the impression that he said that they would be run for base load?

A Yes, I think that's what he did say.

Q Okay. And you tell us that this is clearly contrary to the national administration's energy policy. Do you have some document with you, sir, which says that oil-fired units, which began as oil-fired units, cannot continue as oil-fired units?

A No, I don't. I have the clear understanding that it's in the national interest to not increase our consumption of oil for generation of electricity.

Q Well, what the national policy actually states is that you should not convert coal-fired units to oil-fired units; isn't that true?

A Well, I think inherent in that same policy is that you should not convert oil-fired peaking units into base load oil-fired units.

Q And yet we know, don't we, that the applicants use oil-fired and gas-fired units in their resource projections, with or without Colstrip 3 and 4, for all years for all of their projections; isn't that true?

A For peaking and intermediate load service, yes. In fact, as I recall Dr. Shah's -- pardon me, not Dr. Shah's -- the applicants' exhibits show a total of about 102 megawatts in the year 1980 or '80-'81 as the average energy they expect out of peaking duty on these various gas turbines and old oil-fired units. I think I should add that that 102 average megawatts of energy, assumed by the applicants to come from that type of unit, is not base load service.

Q What did the Portland General Electric Company list as energy from combustion turbines in the exhibits that it introduced initially in this proceeding?

A In the initial exhibits?

Q Yes, sir.

A Frankly, I haven't looked at the initial exhibits for some time, but as I recall there were one or two years where they had some 650 megawatts of oil-fired turbine use. I think in the initial two years, because of delays in the Trojan unit -- I can't recall what they showed in the later years. I know that in the current exhibits, Portland shows some 73 average megawatts on those gas turbines.

Q And do you know whether the Portland General Electric Company ever advised Dr. Shah that it was making any change on the amount of the energy it would draw from its turbines?

A No, I don't know that.

Q Well, the fact is, Mr. Gregg, you know, don't you, that the Puget Sound Power and Light Company and the Portland General Electric Company alone project the use of combustion turbines at a substantially greater amount for average energy than you just stated for all the applicants together. Didn't you know that?

A Not in their current exhibits.

Q What did you say all the applicants were going to use together in combustion turbines?

A In their current exhibits, in the year 1980-'81, 102 megawatts, average.

Q And the year 1984-'85?

A I'd have to add it up. I don't have those numbers readily available. I could take the time to add them up.

Q Well, let me see if we can do it quickly. In the year 1980-'81, PGE lists on its most recent exhibit 73 megawatts and Puget Sound Power and Light Company lists 96 for peak and 9 for average, but in the year 19 --

A I think you'll find on Puget's that it's 9 on the Crystal Mountain and Shuffleton Plant and another 9 on combustion turbines. Puget has 18 in the year 1980. It's in two different lines on their exhibit.

Q Yes, it is, indeed. Okay. We'll let those exhibits add up the figures because they will be the evidence. And the combustion turbines of the Portland General Electric Company still have the same 650 megawatts of capacity available that they had on the original exhibits, right?

A Capacity, I presume that's right. I don't have those exhibits in front of me right now. In fact, I would be surprised if it's only 650 in the later years.

Q Oh, you think they'll have more capacity than that later?

A I'm not sure, but I thought they had capacity in the range of 800 or 900 on peak.

Q Do you think the Edison Electric Institute is a responsible organization to determine load factors for coal-fired generating stations?

A I presume you mean plant availability factors?

Q Sure.

A Well, I think the operator of the plant is probably the best one able to provide an availability factor for that plant. The Edison Electric Institute is probably the best industry organization to gather composite data from the industry. They've been doing it for several years.

Q Would you turn next, Mr. Gregg, to page 23 of your statement. Line 15, you state that there is an estimated 202 million dollars per year to own and operate the Colstrip projects. Where did you get that figure?

A I derived it from our planning figures.

Q Have you ever heard of another figure being used by any of the applicants in this proceeding?

A I presume somewhere in this mass of testimony in these proceedings there are other numbers prepared by other applicants, yes.

Q What are they?

A Frankly, I don't know. I haven't read all of the testimony.

Q What does that figure include?

A The 202 million?

Q Yes.

A It includes levelized fixed charges on some 776 million dollars worth of investment in the plants amounting to about 131 or 2 million dollars of annual charges. It includes some fixed operation and maintenance costs on the plants amounting to about 4 million dollars a year. It includes fixed charges on the investment of 214 some odd million dollars in the 500 kV transmission associated with the project amounting to some 38 million dollars. It includes fuel and variable operating and maintenance expenses on the plants to produce 693.8 average megawatts of energy to the tune of about 29 million dollars.

Q That's about 202 right there?

A I hope it adds up.

Q And so it would not include, therefore, the costs of coal use, other than the fuel cost itself?

A I'm not sure I understood that question, sir.

Q Coal handling facilities and the delivery of coal?

A Well, the coal handling facilities at the plant, yes. It includes the coal handling, too.

Q As part of the fixed investment, but not from the mine site to the plant?

A No, it includes operating and maintenance expenses on handling the coal.

Q You told us it included fixed maintenance. Does it also include other maintenance items?

A The coal suppliers'coal handling costs are included in the cost of the coal, and the coal handling costs at the plant; removing that coal from the surge pile into the bunkers in the plant is included in the fuel charge and variable operating and maintenance expenses that I have included in that last number of some 29 million dollars.

Q It does not include energy loss, does it?

A On the transmission, is that what you're asking about?

Q Yes, sir.

A No, it does not.

Q It does not include energy losses, sir?

A Well, certainly. It includes the fuel burned to provide that energy.

Q But it does not include the loss of energy over the transmission route, does it?

A No.

Q It does not include the loss of energy from the generation facility, does it? You just told us that was around 37 megawatts as I recall?

A No, it does not.

Q And it does not include any assessment for environmental harm, does it?

A If there is any, it does not.

Q All right, sir. Page 25, please, Mr. Gregg. At line 17 you make the statement that most authorities do not agree with the energy policy report of the Ford Foundation on its forecast of energy use, nor with Dr. Brewer's analysis of projected energy comsumption. Do you include in the category of most authorities, the chairman of the Montana Energy Advisory Council?

A No, I don't include him as an authority.

Q Do you include anyone in Montana outside the Montana Power Company as an authority?

A I include in that statement those authorities whose forecasts are exhibited on the Applicants' Exhibit number 240-G.

Q I see. And only those authorities?

A Those were the authorities I was citing.

Q All right. So that's a list of ten different sources?

A Right.

Q Okay. We'll come to that exhibit in a little bit. Next, I wanted to talk with you about the West Group Forecast a little more. You discussed that in your statement. By the way, Glenn Nogle is still the compiler of that forecast, isn't he?

A He's chairman of the loads and resources subcommittee of the Pacific Northwest Utilities Conference Committee.

Q Right.

A And as such he has the major responsibility for compiling that forecast.

Q He was originally listed on our witness list for surrebuttal witnesses, but I guess you're substituting for him in the discussions that you're making for the West Group Forecast?

A I think that was the intent.

Q All right. Now, one of the things that the 1976 West Group Forecast does not do that last year's forecast did do was to supply us with a surplus energy description, right?

A A surplus energy description? Do you mean a definition of surplus energy?

Q No, pages on which the surplus energy are listed?

A Oh, I think it's there, in the section entitled "Peak and Energy Capabilities," section 5. I'm not sure I understand your question.

Q Let me see if I can find the page, Mr. Gregg.

A I might have the wrong page, just a second here. No, that's just the peak capabilities apparently. Pardon me, it's in section 3, the "Summary Tabulations of Resources and Requirements." It shows total hydro surpluses in excess of firm load carrying capability by years.

Q What's the title of that page? Oh, I see. Good. The reason I asked you that question is that I didn't receive a copy of the total West Group Forecast until today. I'd only received what the Bonneville Power Administration delivered to me in Portland last week, and they did not have this same page, the "Surplus Energy in Excess of Firm Load Carrying Capability for Forty Years of Water Record," but it is in the '76 forecast, too; I'm glad to see it there.

A Unfortunately, Uncle Sam's mail service didn't get these to us from Spokane in time to distribute them with my testimony last week.

Q That happens sometimes. Well, what this does is to take each operating year forecasted and determine the amount of surplus energy that should be available to the people in the West Group in excess of their firm load carrying capability based upon 40 years of experience with hydroelectric generating capacity, right?

A Based upon the 40 years of historical water records.

Q And what that meant in terms of hydroelectric generating capacity?

A Yes, okay. Yes.

Q Good. And that shows, does it not, that for every year from 1977 through 1986, there will be surpluses?

A No.

Q So, what year does it not show surpluses?

A It shows that if we have the period -- a repetition of the water situation that occurred in the 1929, '30, '31, '32 period, there will be no surpluses in any one of these future years.

Q For the years 1929 to 1931 and for the year 1936-'37, you'll come out exactly zero, that is, no surplus, no deficiency, right?

A Well, that depends on which year of the future you're applying the 1936-'37 water year to. In some -- in the year '76-'77, for instance, there is an average of 59 megawatts; there is one month of surplus production --

Q But if you take the annual average -- let's look at the last column, the annual average. You will have surpluses in every year projected through 1986 for replicating the water conditions as they existed since 1928, unless we replicate the water conditions of 1929, 1930 or 1936 in which case we will have zero as a surplus.

A There will be some annual surpluses in all those years but two or three, but many months within those years where there is no indicated surpluses.

Q And the West Group tells us what the annual average of the surpluses will be. It ranges generally around 3000 megawatts, doesn't it?

A I would guess that that's probably reasonably accurate, 2500 to 3000 megawatts.

Q Now, as I understand it, the Montana Power Company still is not included in the West Group Forecast; is that right?

A That's correct.

Q The Idaho Power Company and Utah Power and Light Company are also not included in the annual forecast of the West Group?

A That's correct.

Q Now, there is something new that has been added to the West Group Forecast this year, and that's something that you describe in your statement starting on line 11 on page 27, and that's something called the Energy Reserve Planning Model which gives us probabilities that loads will be met; is that right?

A That's correct.

Q Now, with respect to that planning model, can you tell me, Mr. Gregg, how was the raw data obtained and used in order to create the model?

A Any particular type of raw data you have in mind? There's lots of different kinds of raw data in the --

Q Well, whatever you know about, tell me about, would you please?

A The loads used were the West Group forecasted loads. The resources are derived from the standard regulation studies that the Northwest area does in analyzing the energy capability of the hydro system under any given sequence of water flows. The -- excuse me a moment, let me reference something here.

(pause)

A The arrival times for new thermal plants in the system are the milestone dates prepared by PNUCC in this same West Group Forecast. The raw water data is prepared by the -- well, it used to be called the Columbia Basin Interagency Committee and it's now the Columbia River Water Management Group; I believe that's the proper terminology. That water data, of course, is historical data adjusted for irrigation depletions, irrigation evaporation and other kinds of depletions. Essentially that takes care of the basic kinds of raw data that go into any of these kinds of studies.

Q Now, you tell us in your statement that you used a probabilistic simulation program with the Monte Carlo simulation technique; of course, that's just a mathematical process that's available to anybody. How did you use it?

A Well, I think maybe I should state that I didn't use it.

Q How was it used?

A In effect the entire system was regulated against the water availability in any given year with the probability that new thermal plants would arrive early or late based on a probability distribution, a log normal distribution, that was assumed for the arrival times of thermal plants. It was run against various available capacity factors on those thermal plants based on an exponential distribution employed in the short-term availability. The average hydro capability is apportioned into three seasons of the year by logic which simulates the requirements of the Pacific Northwest Coordination Agreement.

Q How'd you do that?

A That's done in the same fashion that the -- or very nearly the same fashion that the standard regulation runs are done by the coordinating group of the Northwest Power Pool and the coordination agreement.

Q What is that standard?

A Well, there's lots of standards in that procedure that are defined by the rather complicated coordination agreement itself on the rules by which you draft reservoirs to protect firm load. I think probably the description in the West Group Forecast itself is probably as good a description of the procedure used in the energy planning model. It's probably a better description than I can give.

Q I see. You could not add to what is already in the West Group description itself?

A I don't think so. The source of the raw data is the same sources as are normally available to the coordinating group for any of their studies.

Q In any event, the result of the use of this new procedure shows that in every year the probability for that year alone of meeting firm load is at least approximately 90 percent; isn't that right? There is a low of 86 percent, I think, in one year as a probability of meeting firm load?

A Well, there are several years in the 80 percent range, 85 to 89 percent range, the years '78-'9 through '82-'3 probably.

Q 88 percent, 89 percent, 88 percent, 86 percent, 89 percent, right?

A Right.

Q Now, can you tell me, Mr. Gregg, whether the individual load breakdown information that appeared in the 1975 West Group Forecast is also available in the 1976 West Group Forecast?

A I understand the subcommittee for some reason, and I'm not privy to all their reasoning, did not publish the individual system load data in this year's publication. I think maybe there is a move to conserve paper.

Q Well, whatever the move was motivated from, it certainly results in our not having individual breakdowns for each company, doesn't it?

A I guess that's right, yes.

Q If there were inconsistencies between the companies' individual offerings and various proceedings, and what they offer in the West Group Forecast this time, we wouldn't know about that because it wasn't published, right?

A I presume that's correct, yes. The data submission for the West Group Forecast by the individual companies is done under a set of criteria which is designed to try and get the individual numbers in a compatible fashion so they are properly addable to a regional forecast.

Q DNR Exhibits 47-A, 47-B, 47-C, which I have just marked for identification, are West Group area load and resource compilations from the Bonneville Power Administration branch of power resources, February 26, 1976. Could you expect to find that material distinguished for 3 and 4 in the 1976 West Group?

A No, I wouldn't expect to find the data on DNR Exhibit 47-A in the West Group Forecast.

Q Why not?

A As I quickly review this, it appears to me to be a Bonneville modification of the West Group forecast to presume certain thermal plants, anyway -- I'm not sure which ones; I don't think it shows -- to be delayed one year from -- I don't know whether it's a milestone date or commercial scheduled date or what -- and also another option of those thermal plants delayed two years. It doesn't identify which plants are delayed; it doesn't identify whether they're delayed from the milestones used in the West Group Forecast or from some other date. I'm not sure what this purports to be.

Q Well, you've seen that kind of information --

A That's what it is, a modification of West Group type of data. I wouldn't expect it to be in the West Group Forecast.

Q Okay. That's what Bonneville does on a regular basis, of course. They have to do their planning --

A I think we all do that.

Q Sure. And you've seen that kind of information year after year coming out of Bonneville's offices, haven't you?

A Probably.

Q Sure. And in particular have you seen that 1976 data yet, Mr. Gregg?

A These DNR Exhibits? No, I haven't.

(Mr. Peterson gives copy of document to witness.)

Q Have you seen the same compilations of data in earlier years by Bonneville?

A I presume I have. I haven't necessarily studied them. I see a lot of paper that I can't remember.

Q Yes. Well, it's not unusual for you to find, is it, Mr. Gregg, that Bonneville has actually made a load forecast that is different from the West Group Forecast, is it?

A I'm not sure I would -- when you say load forecast -- I presume that the numbers on these three DNR Exhibits that you just handed me for load are essentially the same as the West Group Forecast load, at least as I read the titles of the pages in the column headings; I would presume that these are the same loads. I think what they're trying to define is the sensitivity of the load resource balance to various delays, or possible delays, in thermal plants.

Q Okay. You don't have any doubt that that's Bonneville data, do you?

A No.

Q Nor that it's dated correctly?

A I presume it's dated correctly, although --

Q Okay. Let's turn to Exhibit 240-G of the exhibits that you have marked in connection with your testimony, Mr. Gregg. That's a graph showing utility electricity demand projected by the ten different authorities that you referred to earlier, and those ten different authorities have a 100 percent difference from the low to the high on projections as of 1985, don't they?

A Very nearly 100 percent from glancing at the exhibit, yes.

Q Now, Mr. Gregg, I want you to look at Exhibit number 239, if you would, sir. Excuse me, leave that one out, but I just wanted to ask you a couple of other questions before we got to that. You would agree, would you not, Mr. Gregg, with the statement made by Mike Katz last week in describing his study for looking at electrical energy demands, that they are determined by seven factors, electricity costs, population, number of households, per capita income, depreciation of applicances, rate at which households are formed and life styles?

A If I understood the meaning of the last term, I could probably agree that each of those items are inputs into the total need or demand requirement of the customers. I'm not sure that is all-inclusive, that list; in fact, I'm pretty certain it's not, unless the last item is to be a catchall to catch everything up, all the other things.

Q What's omitted?

A Well, I'm not sure. People's preferences irregardless of their income, their preference to buy a new -- my wife's preference to buy a new range, for instance.

Q Whether she wants to buy a better insulated one that uses more or less energy?

A Or maybe she wants one with fancier gadgets on it that's less efficient; I don't know. These are differences that I presume are racked up in the final unknown word called life styles.

Q Now, the subject of households and their determination on demand really requires the breakdown to determine family size and house size, doesn't it?

A Right. And again, individual people's preferences on what size house they want.

Q And it doesn't help us to know that we have ten houses using electricity last year and 20 houses using electricity this year if you have the same number of people, even though you have a larger number of houses, and if the house size is substantially smaller than it used to be. We've got to look at all of those things, don't we?

A That's right. That's why I said that I don't know if Katz's list is all-inclusive.

Q Well, it may be breakdowns under the categories that he mentioned and, for example, in the households, we know, don't we, that the trend today is for the building of smaller houses and for having smaller families? That's true, isn't it?

A I don't know that that's true.

Q You don't know that that's true?

A No.

Q You've never looked at the demographics on that?

A Well, frankly, I'm not certain that there are valid numbers on how many houses are built at 1000 square feet, how many at 1200 square feet and how many at 1500 square feet, et cetera. Maybe there are numbers like that; I haven't seen them.

Q Do you see houses being built these days for 5000 square feet?

A No. At least I haven't in my neighborhood.

Q But we still have some of those rather large sized houses in some of the communities in Montana and elsewhere, don't we?

A I presume we do. I see houses built in my neighborhood that maybe run 1000 square feet and I see others that run 2500 square feet.

Q And it would be your testimony that you don't think there's any trend to building smaller houses these days; is that right?

A I wouldn't presume to make a judgment on the trend, frankly.

Q You just don't know?

A No.

Q And the same thing with family sizes, you don't know what that trend is either?

A I think that trend is probably down.

Q Downwards, smaller families?

A Smaller families.

Q All right. Now, is it correct, Mr. Gregg -- let's get a couple of catchall things with you before we get to Exhibit 239. My understanding is that the Montana Power Company has not employed the legislative tool which was enacted last year as House Bill 663 for utilities to lend capital for the construction or installation of energy conservation materials in a dwelling; is that true?

A I presume it's true. I'm not privy to all the decisions made in our company, but I presume that we haven't held ourselves out to be a lending agency.

Q Yet. Now, it's also true, isn't it, Mr. Gregg, that the use of heat pumps would make the use of energy 260 percent more efficient than without heat pumps?

A I'm not sure of your number of 260 percent, but I know that heat pumps are considerably more efficient in heating and cooling homes, for instance, than either central air conditioners or central furnaces.

Q You wouldn't quibble with the number; you just don't know it personally in your head, right?

A I haven't tried to calculate that, no. It depends on what you're comparing it to obviously. There are various efficiencies in non-heat pump installations.

Q Did you also know, Mr. Gregg, that this month the Seattle Power and Light Company announced its proposal to build a coal-fired electric station in its service area, fueled by 800 Btu per pound coal from Colstrip?

A No, I wasn't aware of that. I don't even know who Seattle Power and Light Company is. I presume you mean Seattle City Light.

Q Yes. Seattle City Light?

A And you tell me they have announced a new coal-fired plant? Is that correct? That's news to me, but I'm not surprised that I'm not up on it.

Okay. Yes, it was -- well, I got the preliminary word on February 26, 1976. It's part of their study called "The Energy 1990 Study"; have you heard about that?

A Well, I've heard about it. In fact, I read something in the paper here, yesterday or this morning, about a questionnaire they're sending out to their customers.

Q Right. I appreciate your correcting me in the designation of company, the Seattle City Light Company. They're projecting that the plant will have 1982 operation with a 30 year life, 1000 megawatts, located in Western Washington, fuel costs of $5.15 per ton from Colstrip. Did you know that Colstrip was going to provide that coal?

A No, I didn't.

Q Okay. Now, we can get to Exhibit 239. By the way, Mr. Gregg, if we were to subtract from the loads that are described by you in the applicants' total load, those categories called "Sales Per Resale," we would be subtracting anywhere from 8 to 30 percent of the individual applicant's demand projections, depending upon what year we're looking at, which applicant, couldn't we?

A I'm not sure. I don't have that exhibit in front of me. You're talking about Exhibit 3-C, are you?

Q No, that doesn't give us the full breakdown, unfortunately, and we also do not have before us from each company sufficient data in this record to provide the exact calculation of how much of their demand projection is sale for resale based upon their submitted exhibits. But you know, do you not, that that varies from company to company for year to year by a substantial percentage of at least 8 percent?

A Well, I don't know about the 8 percent, but I know it does vary substantially. I know we have sale for resale commitments right now that we won't have next year. Alternately, we have some firm long-term sale for resale commitments to various cooperatives; some of the other applicants, I'm sure, have similar sale for resale obligations to municipalities that buy part of their power from the applicant company.

Q Now, Mr. Gregg, on DNR Exhibit number 48 marked for identification, I have placed the computed figures taken from Exhibit number 239, based upon six provisions to what you have put before us as Exhibit number 239, but in all cases I've included sales for resales although, if we really wanted to know what the consumption growth was, that would not be a correct reflection for each company, would it?

A The consumption by that company's ultimate consumers, presumably not; however, that does not necessarily mean that the company can be absolved of their sales for resale obligations. They have those obligations.

Q Yes, but if we wanted to know what the real impact was of the total figures including sales for resale, then we would not be able to make that determination unless we found out what the load resource capability was of each utility that received the power sold on the sale for resale basis, right?

A I presume that's true, however, many of these sales and probably most of them are to other utilities which have no resource capability.

Q That would be true in some instances, and in other instances it would include utilities in the Pacific Southwest, wouldn't it?

A Yes, in the case of some of the applicants they have contractural sales for resale to the Pacific Southwest.

Q And in some cases it would include a utility called the Idaho Power Company, or the Utah Power and Light Company, or the Arizona Public Service Commission; isn't that right?

A I presume you're correct in regards to Idaho and Utah, and I'm not certain about any contractural commitments of the applicants to Arizona Power Authority.

Q I think it's the Washington Water Power Company that has the contractural agreement with Arizona Public Service Commission; are you not familiar with that?

A Without reviewing their exhibits here, I can't comment. I'm not familiar with it if they have such a commitment.

Q Okay. But nevertheless, on Exhibit 239 and on my DNR Exhibit number 48 which I just placed before you, we have included this category called "Sales for Resale." Now, variation number 1 on the theme, which is the first one that I'd like to discuss with you, that takes your Exhibit number 239 and does exactly what you do. It starts with a base of 6,278 megawatts. That's the same one that you used, wasn't it?

A Yes, that's the one from Dr. Shah's Exhibit 212.

Q Column A?

A Column A, for the year 1975-'6.

Q So my revision number 1, your Exhibit number 239, without any change except instead of using a 4 percent growth rate, I have used a 3 percent growth rate, and when you do that, Mr. Gregg, you will find that the forecast, going down from 1976 through 1984-'85, results in surpluses for every year from 1976 and '7, through 1984-'85. You wouldn't disagree with that, would you?

A If the mathematics is right, I presume you're correct. It looks reasonable.

Q Okay. Then revision number 2 that I have computed for you, sir, for your information on Exhibit number 48, is again your Exhibit number 239, but instead of using the forecast base figure of 6,278, I have reduced that by 3.1 percent, which, of course, is the same amount that the West Group reduced their forecast for the first year of their study when they came out with their most recent analysis. And if you do that, then you will have a base of 6,083 megawatts and, of course, that wouldn't surprise you then -- otherwise we leave Exhibit 239 entirely alone, and again we use the 3 percent growth factor and there is no other change from the first revision -- and it's not going to surprise you to find the surpluses for every year are going to be larger than they were the previous year, since we start from a lower base, right?

A It isn't surprising at all.

Q Those figures look reasonable to you, do they not, subject to the mathematical errors, of course, but that looks reasonable, doesn't it?

A Yes, I would presume they are reasonable.

Q Now, Mr. Gregg, starting again with your Exhibit number 239, using as you did Exhibit number 212-A of the applicant companies, but this time using column B, not column A, which is the Commonwealth forecast based upon its expertise, still using the applicants' figures -- of course, we have a lower base, 6,179 instead of 6,278, so the base for the third revision is 6,179 megawatts -- otherwise leaving your Exhibit number 239 unchanged and otherwise the same computation at 3 percent, again you would find that the surpluses for every year, 1976 through 1984, should be larger than they were in the first revision, but probably not as large as they were in the second revision, given the fact that the second revision started from a slightly lower base, right?

A Correct.

Q So now we move to the fourth revision. The fourth revision is the same as the third in that it takes your Exhibit number 239, with the same column B of Exhibit 212-A and then takes column C from each of the Exhibits 212-A through J. Can you tell me what column C is going to be on Exhibits 212-A through J?

A Column C will purport to be Dr. Shah's analysis of what the applicant companies' resources are.

Q Actually it's labeled "Applicant Company Resource" as distinguished from "Commonwealth Resource Analysis," and again we have the difference that Dr. Shah described between applying the applicant companies' figures on a uniform basis, that's column C, and applying the applicants' resources with his expertise, and that's column D; we're just using column C now?

A But I think it's important to recognize that this is Dr. Shah's analysis of our resources and not our analysis of our resources.

Q Correct. And therefore we are going to find a different amount of resources, aren't we?

A Obviously, by some 700 average megawatts of energy in oil-fired combustion turbines for one.

Q And in other areas, too, won't we?

A And in other areas, yes.

Q Sure. Now, in revision number 4, then, using the same column B as Exhibit 212-A that was used in revision three, and using column C from Exhibits 212-A through J, and using the first of the projections that you have made, which was on a 4 percent growth rate, we will now start from a base that would be the same as before, 6,179 megawatts, and we will find the growth to accelerate more rapidly than it has in the past because of the 4 percent growth rate; wouldn't that be correct?

A Correct.

Q But even doing that, Mr. Gregg, you will note that in every year, 1976 through 1984, you will find surpluses, won't you?

A That isn't surprising.

Q Good. Then taking the fifth revision to your efforts with respect to Exhibit number 239, again we will take the Exhibit 212-A column B, and this time we will reduce the base by the same 3.1 percent that the West Group reduced its base for this last year. That would make the base on the fifth revision

5,987 megawatts. Can you think of any reason why we should be reducing the base from Dr. Shah's figures by 3.1 percent?

A No.

Q Well, how about the fact that he took his figures from the applicants the year before they reduced it by 3.1 percent. Doesn't that sound to you like maybe he got his information a year earlier than the applicants reduced their own figures?

A No, not necessarily, depending on how he approached his forecast. We both have the same historical data to work from.

Q But you know, don't you, Mr. Gregg, that Dr. Shah got his data in April of 1975, and you participated in giving him that data?

A That's correct.

Q All right. And you also know that in March of 1976, the West Group Forecast came out with a 3.1 percent reduction in the load for the first year; isn't that true?

A Yes, I know that. And Dr. Shah presumably had as good a crystal ball as we do in making his forecast from the same historical data. If he's a lot better than we are, then he would have seen coming the recession that we all suffered in 1975 that resulted in that lower forecast in the 1976 forecast.

HEARINGS EXAMINER: We will take a 15 minute recess now.

(RECESS AT 10:30 A.M.)

The hearing was reconvened at 10:47 A.M., following a brief recess.

HEARINGS EXAMINER: Go right ahead, Mr. Shenker.

CONTINUATION OF EXAMINATION OF DONALD B. GREGG

Rebuttal,cross, by Department of Natural Resources and Conservation

By Mr. Shenker (continuing):

Q Before our recess, we were looking at revision No. 5 and to Gregg load growth sensitivity, Exhibit No. 239. Revision No. 5, we've gone through the fact that we're using Column B in Exhibit 212-A of the DNR, reducing the base by 3.1%. In revision No. 5, as in revision No. 4, we also used the DNR Exhibit 212-A through J, Column C. Now, Mr. Gregg, the one addition in revision No. 5 other than the reduction of base is that we're going to use a 5% growth factor here, and if we use a 5% growth factor, again you would expect, would you not, to see more rapid escalation in growth than had been the case when you used the 4% growth factor?

A Yes, that's obvious.

Q So then, on revision No. 5, using Dr. Shah's analysis of the company's forecast, with his expertise, using Dr. Shah's analysis of the company's forecast on a uniform basis, and reducing the base by the difference between the two West Group forecasts for 1975-1976, even with the 5% growth rate, we will find surpluses in all of the years 1976 through 1984, won't we?

A If the mathematics is correct, I presume that's correct. I have a hard time agreeing with the reduction of 3.1% in the base load.

Q Good, we'll talk about that. My purpose now, you understand, is to identify the exhibit to make sure we're looking at the right figures here.

A I understand what's behind the figures, yes.

Q Then you can make the comments with respect to the exhibits. Revision No. 6 is the same as No. 5 in that we use Column B of Exhibit 212-A. That would be Dr. Shah's expertise on the Applicants' forecast. It's the same base. That would be the West Group reduction of 3.1% between the two years, '75 and '76 when they did their forecasts, but this time we'll use Column D of Exhibits 212-A through J, and that, of course, will be Dr. Shah's analysis of the Applicants' forecast based upon his own expertise, and when we do that, let's use a 6% growth rate for that year, beginning the base, of course, in 1975-1976 in all years. If we use a 6% growth rate, again we'll have a faster acceleration in the growth than in any of the previous revisions, right?

A Correct.

Q But nevertheless, we still have surpluses in every single year from 1975 base, first forecast 1976 through the last forecast, 1985, isn't that correct?

A If the mathematics is correct, yes.

Q Now I think we've adequately described all of the materials that have been put on to the DNR Exhibit No. 48 so that the record should be clear about that. What I would like to ask you, Mr. Gregg, is, first, as a general matter, you will concede, will you not, that the amount of energy forecast for years to come depends both upon the base at which you start and the percentage of growth which you compute for each year?

A Well, I think I can't disagree necessarily with what you're saying. I think I disagree a little with the way you say it. The percentage growth is the result of the forecast. The forecast begins with a base and forecasts additional load as it comes and the result between those two numbers is the percentage.

Q But you didn't do that on Exhibit 239. You didn't actually make a forecast which resulted in a percentage growth. You took a percentage growth and applied it to a base, didn't you?

A Yes, to indicate sensitivity.

Q Right.

A Of the load resource balance to an assumed load growth rate, yes.

Q And resources must be added to the picture once you have the projected load in order to determine whether you're going to meet your load?

A That's correct.

Q Now, it is obvious, is it not, from DNR Exhibit 48, that depending upon what resources you use for your calculations, you can wipe out deficits and create surpluses, isn't that true?

A Depending on what numbers you use for resources, sure.

Q And if, for example, a utility company has a resource on its planning board which it doesn't put into its projected resources, then that's a number we haven't used to wipe out a deficit, isn't it?

A If they have such a number, yes.

Q Now we do know, don't we, Mr. Gregg, the Applicants have taken out of their resources anywhere from 300 to 3,000 megawatts of average energy over the period of time that we have been discussing in these proceedings between the first and second sets of exhibits that they have offered? They did that, didn't they?

A They might well have, because of delays in additional units; also, because of additional uncertainties of oil availability, nuclear plant availability. I'm not sure I can necessarily agree with the 300 to 3,000 megawatt-wide range that you quoted. I can't remember those numbers, but there was a reduction in resources.

Q It's not hard to come up to those numbers, Mr. Gregg.

A Just by comparing the two exhibits, yes.

Q We know that some of the units themselves will add up to that. Pebble Springs, for example, is how much?

A Well, Pebble Springs is about a 1200-megawatt unit.

Q For each of two?

A For each of two, yes.

Q And Skagit is how much?

A About the same, 1250, 1200.

Q And those have been either canceled or rolled back on some of the years of some of the Applicants' forecasts as between the two sets of exhibits, right, moved them from 1981 to 1983 and from 1983 to 1985?

A That could be. I can't remember the schedule last year. The schedules change, it seems, every time somebody gets a chance to look at what the progress is in all the hullabaloo involved in getting a new plant on line these days.

Q Well, what it really amounted to now, Mr. Gregg, is that the Applicants have said, "We've slipped a lot of other resources and we don't like any of the other alternatives as well as Colstrip, whether the facilities are available or not, but we haven't slipped Colstrip yet and it's our last chance and we ought to use it, whether it's the best alternative or not," isn't that about it?

A I don't agree with that, because we have slipped Colstrip. We started out with the Colstrip project hoping to get it on line in 1978 and 1979. It's now slated at 1980 and '81. We're faced with any reasonable forecast of a possible deficiency in the year 1979-80, even after accounting for the slip in load that was occasioned by this present recession that we're just coming out of. We still have an indicated deficiency in 1979-80 that would have been covered had we been able to maintain the original schedule on Colstrip 3 and 4.

Q Well, Mr. Gregg, it's become pretty obvious in this proceeding, after great and laborious effort that we're only talking about the years 1980 through 1982, because after 1982, everybody knows we can do something else, if necessary.

A I don't know what.

Q Well, have you really determined that in seven years there would be no alternative available for the Applicants other than Colstrip 3 and 4; between now and 1983, seven years' time, you have no other alternatives available?

A Mr. Shenker, the alternates that we have available until 1985,6, or 7, in that range, are now on the boards and trying to move through all the procedures necessary to get those units under construction.

Q Come on, Mr. Gregg. If 10,000 megawatts are going to be built at West Roosevelt, Washington, we all know that Pacific Power and Light Company isn't going to use all 10,000 of those megawatts. Those can be onstream in commercial operation, available to you and the Montana Power Company, by 1983. Now, you will concede that, won't you, sir?

A No, I won't concede that, because I'm not sure that I even know what you're talking about at West Roosevelt. I haven't seen plans on the West Roosevelt plant that you're talking about.

Q Didn't you know that well over a year ago, the Pacific Power and Light Company filed an application with the Washington Siting Council to build six nuclear plants and four coal-fired generating stations for 10,000 megawatts of capacity, at West Roosevelt, Washington? Didn't you know that?

A I know they applied for a site, and frankly, I can't remember the name of the site. It's somewhere in central Washington just north of the river, as I understand it. That could accommodate an ultimate development of something like that to be developed over the next 25 to 30 years.

Q And if you wanted to develop it in seven years, you could do that, too, couldn't you?

A I'm sure you could not develop 10,000 megawatts in seven years on one site.

Q How about 3,000?

A Possibly. I don't know. I haven't seen their plans.

Q So you could double the production that is expected out of Colstrip 3 and 4 by 1983 at some other site if you wanted to. Now, between 1980 and 1983, there is dispute as to whether you can provide such resources, so if we look at the years 1980 to 1981 and 1981 to 1982 and 1982 to 1983, that's the nub of the controversy that we have in this proceeding as to whether there is a need for these facilities to generate that much megawattage, wherever they are, leaving that question aside. Now, just look at those years, Mr. Gregg. On your Exhibit No. 239, it is true, is it not, that if you use a 3% growth, you will have surpluses in those three years?

A Well, that doesn't show in my Exhibit 239. It apparently shows on your DNR Exhibit 48.

Q Well, you don't disagree with that on mathematical grounds, do you?

A No, if you assume a 3% load growth, your exhibit shows surpluses in all years in your alternate No. 1 to my exhibit.

Q And that's 3% growth, with no other change to your exhibit, right?

A As I recall what you told me.

Q Now, there are a number of variables to go into the determination of what the demand will be in those three years and what the resources will be in those three years. One of the variables is the percentage of growth, correct?

A Yes, which could be as high is eight or ten percent.

Q Or it could be a 100% if we wanted to be running up the entire stream, but nobody believes that it's really going to be as high as 7%, isn't that correct?

A Oh, I think it's very possible that it could be as high as 7%.

Q Is there a single witness that you know of in this proceeding, Mr. Gregg, who advocates 7% growth as the probable projection for the West Group area, or the Applicants taken together, alone?

A None of the Applicants have indicated that, as I recall. Well, wait a minute, let me revise that. I think Portland General Electric Company's forecasted load growth is in the range of 7% over the next ten years. Dr. Shah's forecast of Portland General Electric's load growth rate resulted in some 9%, I believe --

Q Accepting their figures.

A -- based on their historical data.

Q Yes, with their figures.

A -- by Dr. Shah. We have seen in the last six months as we're starting to come out of this current recession load growth rates on some of the applicant companies as high as -- what, 10%?

Q Well, Mr. Gregg --

A Seven or eight percent, anyway. All I'm saying, Mr. Shenker, is that I don't think seven or eight or nine percent is impossible. I don't think 3% is impossible. I think probably 9% is improbable, and I think 3% is highly improbable.

Q Okay, now, you will concede, won't you, Mr. Gregg,that if one month this year you show 10% more in the way of average energy sales than you did the same month last year, that doesn't tell you anything in terms of your long-range projections, does it?

A No, that's right. That's one of the points in my testimony, that you can't make long-range forecasts based on one or two months or one or two years' history.

Q That's right, you have to make intelligent decisions based upon forecasts that include all of the factors that you and I have discussed and that have been discussed by many other witnesses in these proceedings. Now, if you have as high as a 6% growth rate, which is what you believe to be the most probable high figure, isn't that correct?

A No, not the most probable high figure -- the most probable figure.

Q Well, you say it's between 5 and 6 percent, right?

A It's in that range.

Q So in the probability range that you are most comfortable with the low is five and the high is six, right?

A No, no. I say I don't know what the growth rate is going to be for the next ten years probably any closer than within a percent.

Q All right, and five to six is the range you're --

A When I say the most probable range is going to be in that range of five to six percent, I say the possible high range might be in the order of nine or ten percent. A possible low range might be two to three percent. That's why I'm saying that load growth forecasting is sort of conjectural.

Q Do you know at this moment, Mr. Gregg, what the average energy will be for the year 1975-1976, for the five applicants?

A For the operating year 1975-1976? No, I don't. You can't know that until after June 30th some time, right.

Q You will concede, will you not, sir, that if, as of July 1, 1976, we know that the average energy delivered by the five applicants, both for consumption and for sale for resale, inclusive cf losses, is 5,987 megawatts, that if that is then used as a base at 6% growth, none of the applicants will have, in fact, any deficiencies in the years 1980 through 1983, isn't that true?

A If that were the number, and if it were used as the base upon which to grow load at a 6% rate, that's true; however, I couldn't agree that that would be a proper base to apply, with a 6% load growth rate.

Q Is it your position that if 5,987 were the actual energy sales, you still would not use that as the base for growth from there on? Is that your testimony?

A I said that that would not be a proper base to apply a 6% growth rate to.

Q What would you apply to that, a 10% growth rate?

A Very possibly.

Q I see.

A At least, in the initial years, maybe 2 or 3 or 4 years. I think that would depend on the outlook for the economy, for all these other demographic things that many people have talked about. The point I'm trying to make is that the 5987 assumed number for the 1975-1976 operating year would necessarily have implicit in it the effects of the current recession, and if we would like to continue that kind of economic activity, and somehow mandate that that economic activity level is going to continue, then maybe your assumption is right, we ought to use 5987 with -- heck, let's say a 3% growth rate.

Q Or, indeed, if there were some other indicators; for example, the amount of energy consumption as a ratio to economic activity lower than has been the case in the historic past. That would mandate lower growth rates, too, wouldn't it?

A Depending on what caused that change in this ratio that you've just cited.

Q One of the causes, of course, could be the higher price of electricity, couldn't it?

A Could be.

Q Another cause could be higher availability of competing fuel sources?

A Could be.

Q And still another cause could be greater conservation efforts in the efficiency and utilization of electrical energy?

A Could be, and a further cause could be economic recession.

Q Future economic recessions, yes. Now, as you sit here today, Mr. Gregg, on the 25th of March, 1976, you know, do you not, that the likelihood is that the average energy sales by the five applicants here will be a lot closer to 5987 than it will be to the figure which you used on Exhibit 239 as your base, the 6278 number, isn't that true?

A I don't know that I've worked out those numbers, Mr. Shenker, but I presume that that's probably correct, because I'm sure the 6278 number did not -- No, I won't -- I think I'd have to retract that. I really don't know. I haven't looked at the numbers that closely to add them up over an entire operating year. I look at the month of February, where the five companies' average load was 9800 megawatts. I don't know that

I've analyzed the five companies' annual loads to make a judgment as to whether their current load levels of, say, 9,000 megawatts, in the winter months, are indicative of a 6,000 annual average. I frankly haven't played with those numbers that much.

Q I'm glad that you brought up the winter load, though, because that was going to be the last area that I wanted to ask you about. When we talk about average energy, what we're really talking about is the average of the peaks and the valleys in the sales of energy over the course of the year, isn't that true?

A It's the total energy in kilowatt hours over the year, divided by 8760 hours in the year.

Q Just to make the arithmetic very simple, if we had six months at 10,000 megawatts and we had six months at 2,000 megawatts each -- okay?

A Right, go ahead.

Q That would then give us a total of 84,000 megawatts for the entire year, correct?

A Right, megawatt months.

Q Right. We would then divide by 12 and we'd have 7,000 megawatts for the year?

A Yes.

Q Now, you know, don't you, Mr. Gregg, that when you have lower peak months than you have had in other years, that will take the average down? That will happen, won't it?

A Certainly.

Q And you also know, do you not, that in this winter of '75-'76 year, we have had, in the Pacific Northwest and in Montana, a milder winter than we have had in other years past, isn't that true, sir?

A I think generally, that's true.

Q And that has resulted in the use of less energy than we have used in other years for those winter peak months, isn't that true, sir?

A No, I'm not sure it is true, Mr. Shenker. I think the numbers indicate that there is an absolute growth between, say, this warm winter and last year's somewhat cooler winter. I'm not quite sure what you were getting at in the question, but no, I wouldn't agree that there has been a reduction in load this year over last year, just because of the warmer weather. The warmer weather had a reducing effect, but the absolute change in load was still positive.

Q What was the percentage over the entire winter period? It's not in your exhibits, unfortunately, but if you have the entire winter period in mind, that might help us.

A Well, I'm not sure of the temperature relationships between all the winter months. I can recall that January '76, for instance, was warmer than January '75, and there was obviously, as shown on Exhibit 237, an absolute load growth for the five companies without any normalization for temperature differences of 4.4%, 7,000 average megawatts in January of '76 versus 6,700 in January of '75, rough numbers.

Q Are those the five applicants?

A Those are the five applicants.

Q Are you reading from Exhibit 236?

A I'm reading from Exhibit 237.

Q Okay.

A The next to the last set of figures showing January '76 versus January '75 loads -- if we made some attempt at normalizing the January '76 numbers for the somewhat warmer weather this winter, as compared to last winter, that difference would be up some. I haven't made that attempt, but I know January this year was probably some four degrees warmer, probably, in the applicant companies' service areas than January of '75.

Q Right. There's a rule of thumb, isn't there, in relating a single percentage rise in temperature to the amount of megawattage used?

A I think probably every company has a rule of thumb. The Northwest Pool has a rule of thumb and there's a rule of thumb for the coordinated system. It depends on how large an area you're looking at.

Q What's the Northwest Pool's rule of thumb?

A I think this year they're using about 160 or 170 megawatts per degree Fahrenheit for the pool as a total. The coordinated system is somewhere in the range of 125 to 150, and I don't know that they have a specific number for the coordinated system. They generally develop the pool number and then modify that by judgment to include some smaller area. I think Mr. Goldhammer used 135 for the West Group area, for instance.

Q On your Exhibit No. 237 and also on Exhibit No. 236, are you including the month of January?

A Well, on Exhibit 237, the month of January is set aside separately and then it's also combined with all months prior to that back to September.

Q So the last column, where it says September to January, that would be inclusive of January?

A That includes January, yes.

Q The February figures, I assume, would be available now, but they probably were not available to you when you put together the exhibit, is that right?

A That's right. I have some very preliminary numbers that I put together when -- Monday? -- sometime, the last few days, that are very nearly equal to the September through January numbers. The February load growth was down somewhat from the January load growth.

MR. SHENKER: I have nothing further at this time, Mr. Gregg. Thank you very much, sir. I will offer, Mr. Davis, Exhibits 46, 47 and 48.

HEARINGS EXAMINER: Mr. Peterson, do you have any objections?

MR. PETERSON: No objection.

HEARINGS EXAMINER: Very well, DNR Exhibits 46, 47 and 48 are admitted. Mr. Shenker, do you have any objections to the Applicants' exhibits?

HEARINGS EXAMINER: Very well, Applicants' Exhibits Nos. 233, 236, 237, 239, 240-A through H are all admitted.

Rebuttal, Redirect, by Applicants

By Mr. Peterson:

Q Mr. Gregg, look first to DNR Exhibit No. 46, which begins at a base or year of 1972-73 and continues, then, through'74-'75, you stated on your cross-examination that you did not necessarily agree with the method used in the compilation of that exhibit. I'd like you to explain for the record why you do not agree with that method.

A Well, I think the comment was related to the last four rows on that exhibit, where Mr. Shenker described averaging the '73 through '75 growth rate by encompassing two years, by dividing by two, and in the case of '72 through '75, by dividing by three, for instance, and then, on the bottom row, averaging those averages. Those numbers then can mathematically -- don't represent a uniform growth rate over those years. They are just an average of some percentages. Specifically, they're not applicable in use to indicate what a future load growth might be until the actual numbers that they're derived from are properly normalized for known anomalies in the situation, and I think in terms of the Montana Power Company numbers which are in -- what? -- the first column there, they show a drop of load between 1972 and 1973, for which we have a rather simple explanation in that the Anaconda Company shut down their long-term zinc operations when they got out of the electrolytic zinc reduction business. The Montana Power Company lost about 70 average megawatts of load in that year, when the Anaconda Company shut down their zinc operations. The minus 1.6% growth between those two years on Montana Power Company's total load is not necessarily indicative of what's to come in the future.

Q Would you expect a longer term, rather than those years, should be used to predict what the future might be as a method of load forecasting?

A Well, I certainly think you have to look back into history farther to get a better view of the kinds of trends that you're trying to analyze, and certainly, the known anomalies in the situation have to be normalized out of those historical numbers, and it's solely because of that and because of Anaconda Company's rather large proportion of our total load that we have chosen to look at a base load -- and let me put that word, base, in quotes -- a base load which consists of our total load, less Anaconda Company. The actual base that we work with for forecasting purposes is a somewhat different load than just our total less Anaconda Company. It also excludes some other non-conforming loads, as Mr. Hofacker has testified to.

Q With regard to your figure of $202,000,000 a year to operate and own the Colstrip project, you were asked as to what was included in that figure, and related those numbers on cross-examination. You stated that you did not include in there any environmental harm. Do you know whether or not the applicants in this proceeding assert that there's going to be any environmental harm by reason of the operation of those projects?

A I think they assert just the opposite.

Q With regard to energy loss from the transmission and plant, is that normally included in an operating statement for costs of operating generating plants? For example, what energy you need to run the scrubbers?

A Yes, the cost is in there; however, I have to admit that the -- I have fuel included in that number to produce 693 average megawatts, at net. That's 693 average net megawatts, so there is fuel there to operate the scrubbers.

Q And that would be included in this $202,000,000?

A Yes, that's true.

Q With regard to some of the variables which we have to meet in the future in order to give at least some semblance of reasonableness to load forecasting, one of those mentioned was whether or not there will be conservation efforts employed. Now, it's a fact, is it not, that the conservation efforts as far as your company is concerned, Montana Power Company, are ongoing at this time?

A That's correct.

Q And you're familiar with the fact, are you not, that the Montana Power Company has had meetings in this state with representatives of industry such as Johns-Manville to increase the use of insulation, for example, in homes and so forth and to give financing aid through banks and so forth, in order to handle that type of conservation?

A I understand we have had several meetings with Johns-Manville and I believe they were public meetings to discuss the efficacy of increasing insulation in homes to increase efficiency of energy.

Q And for the installation of such things as heat pumps and so forth; those are not matters, however, which can be dictated to the consumer by the utility, are they?

A No.

Q And they surround themselves with many variables, such as the individual's personal financial ability to install and so forth?

A I think that's pretty obvious. I'd like to put a heat pump in my house, but I frankly haven't come up with the dollars to pay for the initial investment yet.

Q And with regard to the recent legislation, Senate Bill 663, which allows utilities to get into the banking business, has that matter been discussed with the Department of Natural Resources and the Lt. Governor's office as to the position of the power company?

A I understand it has. I was not privy to the discussions themselves, but I'm sure it has been; in fact, I've been informed we have been in contact with the Department of Natural Resources and the Lt. Governor's office.

Q And as far as you know, they accepted the explanation which you made relative to the financing for this type of home improvement through the utility, or by a utility?

A I presume they so accepted our company position.

Q With regard to DNR Exhibit No. 48, which is the revision exhibit of the applicants' load growths projections by the Department of Natural Resources and Dr. Shah, in which they generally have reduced the applicants' figures on the base of 6278 to 7179 and then further reduced it 3.1% down to 5987 and projected a 5% load growth, from that and a 6% load growth from that base, it's your position, is it not, that you simply do not agree with Dr. Shah's analysis of the utility's figures?

A I certainly don't agree with his analysis of our resource figures, as described in my testimony.

Q And as far as the numbers are concerned, with regard to the surpluses being shown for each of the years on DNR Exhibit 48, you therefore would not agree or concur with the fact that there is, in fact, going to be surpluses for each of those years?

A I most definitely would not concur.

Q And in the position that you have with Montana Power Company, you would take the opposite view that there will be deficits in some of those years?

A Yes, our entire planning effort is directed currently to trying to eliminate some of the deficits that we see definitely forthcoming.

MR. PETERSON: That's all.

Rebuttal, Re-cross, by Department of Natural Resources and Conservation

By Mr. Shenker:

Q First, with the process of determining averages, it is true, is it not, that if you look at your trend extrapolation historical method of forecasting, what you do is to take the growth from the years 1952 to 1974, determine what that is, on the average, and go from there? Isn't that what you do?

A That's one way to do it, yes.

Q So if, for example, the average growth -- of course, this is almost impossible in the real world, but just for ease of mathematical computation -- if the average growth each year was 5%, then we know that the average you would be taking from that point on would be a 5% projection, right?

A That's one way to do it, yes.

Q And if half of the years it was 4% and half of the years it was 6%, still you'd come out with 5% at the end of the total period of time, wouldn't you?

A However, you might want to factor in other known things, or highly probable things, that you see coming in the future that aren't indicated in the past and change that level.

Q But you don't do that on Exhibit 239, and that's simply a fixed percentage all the way through, right?

A 239 was prepared to show the sensitivity of one or two percent change, or percentage points change, in that load growth rate to the surplus-deficit situation.

Q On the business of heat pumps, what's the cost of installation of a heat pump today, for your home, for example?

A Well, I understand that it would cost me probably something in the range of $2,300 to put about a 3-ton heat pump in my house.

Q You would expect, would you not, Mr. Gregg, with more emphasis being placed upon the installation of heat pumps and the development of that technology, that the prices would come down some, wouldn't you?

A Oh, they might, in the next five to ten years.

Q And if the Montana Power Company wanted to mount a campaign for the installation of heat pumps or indeed, get into that business, you'd certainly want to keep those prices down to make them attractive for people to install them, wouldn't you?

A Yes, I presume so.

Q That's one of the purposes of House Bill 663, isn't it, to loan capital to folks to make those very installations?

A It may well be. I'm not really familiar with House Bill 663.

Q On the subject of the contacts that the Montana Power Company had with the Department of Natural Resources about which Mr. Peterson asked you, the conversations took place between Mr. Moon, of the Department of Natural Resources, and Mr. Ross, of the Montana Power Company, and Mr. Ross's statement was that at this time, meaning last fall, the Montana Power Company was not interested in implementing the program, correct?

A I am informed that that is correct.

Q Finally, with respect to Exhibit No. 48 -- that shows, of course, surpluses based on the use of the variables in the manner we have discussed. I think we all know, Mr. Gregg, that if you agreed that there were going to be surpluses on the systems of the applicants for all those years, you wouldn't want the Board of Natural Resources to certify the Colstrip units 3 and 4, would you?

A I presume, Mr. Shenker, that if we saw surpluses in all those years without the application for units 3 and 4 that we wouldn't have applied.

Q Well, now, there is a time lag, isn't there? You might have seen them at one time and if they didn't exist now, I'm sure you'd be in agreement with me, wouldn't you, Mr. Gregg, that now you realize that perhaps there was some error and you were well-intentioned, thinking at the time that you made your application, and now it appears that without the use of Colstrip 3 and 4, you would still have surpluses for the five applicants, you would not want the Board to certify Colstrip 3 and 4, would you?

A I think, Mr. Shenker, such an assumption would depend on the causes of the change, the so-called change, in our thinking. I can envision a situation that would result in this kind of hypothesis wherein a new alternate became available in the interim between the time that we first saw a deficit and we now see a surplus in your hypothesis, where the alternate might well be one heck of a lot more expensive than Colstrip 3 and 4, and we would still be urging 3 and 4, obviously, to continue to serve our customers with the lowest cost we can.

Q All right, let's not consider new alternatives for the purposes of our discussion right now, Mr. Gregg. Let's just consider that if the applicants in the ordinary course of events indeed believed from their established load forecasts and resource projections that they would have a surplus without Colstrip 3 and 4, in that event, you would not want the Board of Natural Resources to certify Colstrip 3 and 4, would you? You wouldn't be here, isn't that true?

A Well, again, I say, I would have to -- I couldn't answer that question that definitely, as definitely as you'd like to get me to have it on the record, because, for one thing, as I said before, our load forecasts, and everybody else's load forecasts, and everybody else's forecasts of the demographic factors that impact on load, and the economic factors that impact on load, are all conjecture. They are somebody's best guess as to what's going to happen, and even our best guess, we recognize the possibility that we may well be low.

Q Now, Mr. Gregg, just so we understand your testimony, sir, of course it's your view, your opinion, representing your employer, the Montana Power Company, the applicants in these proceedings, if we sent you and representatives of the other four applicants back to the drawing table and told you to do your best job of a current load forecast right now, based on resources now planned, and you came out with surpluses, without Colstrip 3 and 4 included, what I understand you just said is that you would still want Colstrip 3 and 4 certified because of the uncertainties of load projections and resource allocations, is that right?

A No, that isn't what I said.

Q Either you want it certified, or you don't want it certified under the circumstances that I have put. Which is it?

A Let's hark back to the first question along this line that you asked me. If we were sent back to the drawing board right now, first of all, I would say that our best efforts are represented in the exhibits in the present hearing, our load forecasts that are now exhibited in these proceedings --

Q You prepared them yourself?

A -- were made, generally, in the last two or three months, and they're probably the best effort we could make today.

Q The composite, indeed, is something you prepared yourself, wasn't it?

A My group prepared the composite from the individual forecasts of the five applicants.

Q You were the fellow in charge of putting together Exhibit 3-C, weren't you?

A That's correct.

Q So we know that you believe it was your best effort. It was your effort, after all?

A Right.

Q Okay.

A Our best effort would probably be the same load forecasts that we have now; however, if, out of this effort, this new going back to the drawing board that you've just described, there were some other alternate that had become available, that somehow wiped out the deficits that we presently show, and that alternate were one heck of a lot more expensive than Colstrip 3 and 4, I can't depart from my earlier answer.

Q Good. What if the alternate were not more expensive?

A Then we would probably be changing our assumptions.

Q And then you would say to the Board of Natural Resources and Conservation, we withdraw our application, don't certify it?

A Possibly.

Q Well, isn't the other alternative under the hypothesis that we have just been discussing, Mr. Gregg, that you advocate piling surpluses on surplus? Now, don't be ashamed of doing that. People can do that because they believe in the uncertainty of surpluses forecasted and they've got to have some more surpluses to make sure that everything is okay. If that's your view, fine, just state it; if it's not your view, tell me that.

A I think, Mr. Shenker, in order to answer your question properly, you'd have to expand on the hypothesis and tell me what plants, what resources, we saw now that we don't see now; that in your hypothesis, we don't see now and allow me the opportunity to make an economic analysis of all these.

Q Do you want an example, Mr. Gregg? I'd be happy to supply you one. Look at your Exhibit No. 239. There we find on a 4% load growth, for example, that you have no deficits forecasted after 1983. Beginning with the year 1983-1984, you have surpluses. That's also true prior to 1981, with the exception of the year 1979, which we know is not a Colstrip 3 and 4 year. Now, let's assume that the folks up in Puget Sound area or the folks in the Portland General Electric area or the Pacific Power and Light Company area, have a breakthrough, either in technology or in licensing procedures, and they find out that they really can put on line in 1981 the resources that are now forecasted for 1983, the result of which is, to give you the same resources available in 1983, namely, 9,205 megawatts, according to your Exhibit No. 3-C, two years earlier. That's the same resource, we're not bringing in a new alternative that costs something more, it's something that you already had planned, already going to be using for meeting your needs.

A And somehow you sped it up, is that what you're suggesting?

Q Yes. Now, that's a possible hypothesis for you to consider.

A Okay.

Q Now, in that event, having wiped out your deficits for 1981 through 1983, would you still advocate Colstrip 3 and 4 should be built?

A I think we would.

Q Why? You have no deficits.

A We might not, under your hypothesis, advocate they be built in 1980-81, under those circumstances, with only a 4% load growth.

Q I see. You'd want to go to 1986-87?

A Very possibly. What I'm trying to say, Mr. Shenker, is that the entire resource picture is obviously one of uncertainty, but more importantly, it's a mix of the various alternates that might be available, all of different costs, all related to uncertainties in future loads, at probably different costs to each of the applicants if they were going to go joint in some other venture. Each company has to evaluate these things in a total mix situation, and I -- under the question you just hypothecized, you were hypothecizing a 4% load growth.

Q Well, you did, on Exhibit No. 239. I was using that line for you.

A I was using that in my Exhibit 239 to show the sensitivity.

Q I think I understand your position.

A I think my point is that new resources will be required somewhere, some time, unless suddenly we change the load growth from five, six, seven percent per year to zero percent per year.

Q I understand your position now, Mr. Gregg.

A Any viable alternate to provide those resources that ultimately will be necessary has to be considered.

Q Sure, and we know that between now and 1985, there are going to be at least 3500 in megawatts added to the five companies' resources without Colstrip 3 and 4, right?

A I presume your 3500 is correct. That's to cover additional load growth.

Q Yes, those are your figures, from 6172 to 9676 is 3504 megawatts, isn't it?

A Right, okay.

Q Now, as I understand your position, then, under the hypothesis we were discussing, if the deficit should be wiped out and become surpluses, then the utility of Colstrip 3 and 4 would be to look at the period after the time frame that's set out, for example, on Exhibit No. 239, and all of the other exhibits we've had in this proceeding?

A It might well be.

MR. SHENKER: Thank you very much, Mr. Gregg. Nothing further.

Rebuttal, Re-redirect, by Applicants

By Mr. Peterson:

Q Just one matter, Mr. Gregg. You mentioned several times about the difficulty of predicting load growth and that we have to look into the future. Are there specific instances that come to your knowledge or has there been one which has come recently to your knowledge other than what you have set forth in your statement relative to installation of a project in the state of Montana that may require, for example, the availability of 60 or 70 megawatts of energy from the Montana Power Company?

A Yes, we have -- and I think Mr. Hofacker testified to this at some length -- inquiries on several proposed industrial projects that involve orders of magnitude of that character; the Stauffer Chemical plant, for instance, has talked to us about being able to pick up what they're going to lose from

Bonneville when their contract runs out in the mid-80's or early '80's, I think maybe 1983. I can't recall exactly. We've had, as I noted in this testimony, a very recent inquiry from the MHD project in Butte concerning our ability to serve their some 40 megawatts in the CDIF facility at the MHD project, which was not included specifically in our forecasts that were done in November and December. On March 17th, I believe, we had an inquiry from the Northern Tier Pipeline project, asking about our ability to serve some 30-odd megawatts of pumping load in 1979-80 and growing to some 70 megawatts pumping load by 1982, I believe, for their proposed crude oil line from the Puget Sound area into -- I think it's Minneapolis. They asked us about availability of pumping power at some six specific sites in our general service area, which is not included in our load forecasts. These are some of the kinds of background information that I think have to be folded into the kind of hypothesis that Mr. Shenker was just asking me about.

MR. PETERSON: Thank you. That's all.

Rebuttal, re-re-cross, by Department of Natural Resources and Conservation

By Mr. Shenker:

Q Mr. Gregg, if those things don't happen, you're going to have precious little load growth, isn't that true?

A That's one of the ironies of the situation. It would be ironic indeed, if we were in a position, by virtue of not having any certain energy in the year 1980-81, '82, '83, for instance, because of a lack of the Colstrip units, we somehow scuttled the Northern Tier Pipeline project and then, probably a year or two later, when the refineries shut down in Montana for lack of feed stock, we'd probably have lots of power to serve the pipeline -- sort of a vicious circle, kind of thing.

Q But the point I'm looking at, the potential areas to serve in industrial or other users, is that some of those have got to happen if your projections are at all correct now, isn't that true?

A I don't think so. I don't think any of those have to happen for our projections now to be viable. If they were, we would have had them included -- well, no, we wouldn't have had them included, but you're forgetting all the other features of this situation. We've got lots of young people trying to set up new homes and families that are the result of the baby boom after the second World War.

Q The short of the matter is, that you have included in your projections all of the probable areas of growth which you are responsible to serve?

A No, we haven't included all of the probable areas of growth.

Q Do you mean to say that you've made load projections which have not included areas which you think you must serve? You haven't done that, have you?

A Well, certainly we have, and I just described that. Prior to the knowledge of these specific block loads, we made projections, which included no knowledge of that particular growth, and if we were to make a new projection today, with our current knowledge, it might well be different.

Q Yes, it could be higher or lower.

A It would probably be higher.

Q Oh, you think so?

A I think so.

Q You are, of course, making monthly revisions in your forecast now, aren't you?

A We're monitoring the actual monthly loads, as we have done always. We've monitored the monthly load versus the monthly forecast.

Q You do that on a regular basis?

A We don't necessarily make a revision every month, in the load forecast.

Q If it were necessary, you could, couldn't you?

A I'm not sure we could put together a comprehensive, well-defined load forecast in a month. It isn't something you do just overnight. It takes time to prepare all the numbers and do all the analysis that's necessary to prepare a proper load forecast, so obviously we don't do it every month.

Q If you wanted to do it in the space of two months, you could do it then, couldn't you?

A Probably.

MR. SHENKER: Thank you, sir.

MR. PETERSON: That's all, thank you.

HEARINGS EXAMINER: We'll be in recess until 9:00 o'clock on Monday, March 29, 1976.

(HEARING RECESS AT 11:55 A.M.)